CALIFORNIA
OIL WORLD
WICE MONTHLY
FIRST ISSUE
MARCH, 1944

Just a boy on a bicycle

The day is cold. Chill, too, is a youngster pedaling a bicycle around Richmond Refinery. He is collecting samples for constant quality tests at the laboratory. At one of his ports-of-call a man tosses over a pair of warm, wool-lined gloves. "Here, kid," he says, "you seem to need 'em."

Years flit. Some Standard Oilers are discussing the promotion won by a general favorite. One tells the story of the kid on the bike. He knows about it, for he was that shivering boy and the chap just promoted was the cold-weather friend who passed out the gloves. The one-time kid on the bike is happy over a grand break for a regular guy.

Of such people is this Company made up. We wish you could know them *all*. We wish you could think of our refineries less as pipes and stills and tanks, and more as Joe and Ed and Bill, who run them . . . of our wells as Red and Shorty, who get out the crude . . . of every tank-truck and service station in terms of the regular guys who man them.

As an army consists of men more than equipment, so Standard of California consists of people more than things. The men give an army its morale. Our people give Standard of California its character — its spirit. This Company is what its people are.

They are right people — man and boy and woman — honest, human, kindly people. Policy-makers at the top are yesterday's boys-on-bicycles . . . trucks . . . oil-rigs. All want to work for a company of which they can be proud. It follows as the night the day that Standard of California seeks to be a company its people can be proud to work for.

STANDARD OF CALIFORNIA

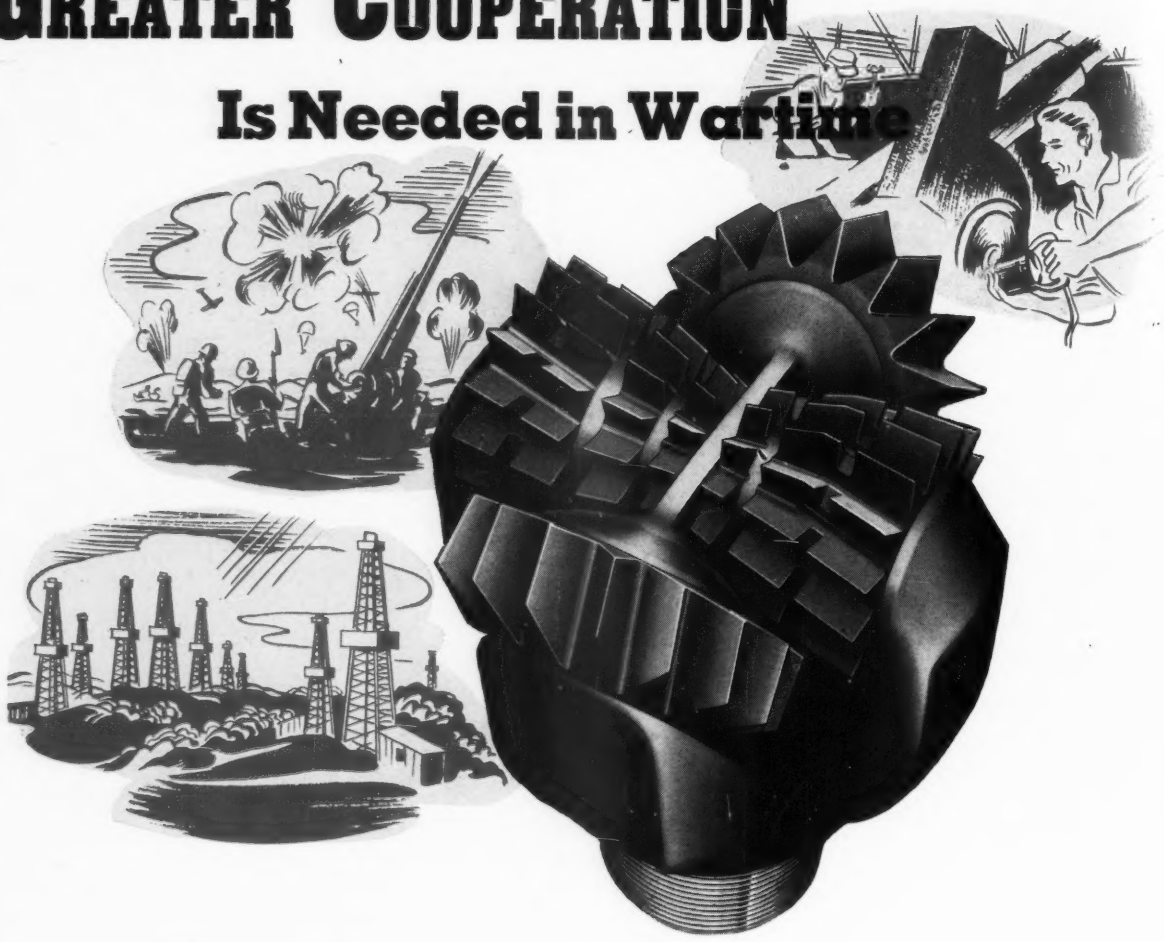
Quality - Service STANDARD

ARMY E NAVY

E flag, with 2 stars, awarded to our Richmond Refinery

GREATER COOPERATION

Is Needed in Wartime



ON THE BATTLE ZONE . . . at the production front . . . in the oilfields . . . whole-hearted cooperation, based on an appreciation of existing difficulties, hastens the day of victory.

Here at Crum-Brainard, in addition to maintaining our production schedule on war materiel, we are doing our level best to maintain quality and to meet shipping and delivery dates on our oil well drilling bits. Because of existing emergency regulations it is often necessary to substitute materials; and in order to bring out the best possible qualities from the steel with which we have to work, we are giving extra care to laboratory control, heat-treating, and all phases of manufacturing. Naturally these processes require more time, but we are sure our customers appreciate this and will cooperate by anticipating their requirements far enough in advance so that materials may be made up and deliveries can be made in ample time to cause no delay in their operations.

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CALIFORNIA
OIL WORLD
and Petroleum Industry

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March 15th, 1944
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Editorial

It has been quite plain for some time that the U. S. oil industry is not going to receive a general increase in the price of crude oil. The most powerful influence against the increase is the President himself.

While the oil industry has expressed itself as opposed to federal subsidies as an alternative to a general price increase, the subsidy proposal has come prominently to the fore in recent weeks. It will be recalled that when Stabilization Director Vinson refused to act on PAW's recommendation for a general increase, he did agree that a price raise for stripper well production was in order and asked that PAW work out the necessary procedure. PAW replied that it could not be done for reasons that have since been set forth.

Now the OPA has taken the initiative in the matter with a program which would provide an increase of 35 cents a barrel for stripper production. This program is to be submitted to Vinson as a substitute for a general increase. Presumably some inducement would also be provided for new wells.

The OPA's oft-stated position is that a price increase which would apply generally to all production is not justified because wells already drilled need no inducement to reach maximum production.

Price Administrator Bowles stated recently in support of his position that a 35-cent increase on the output of new wells would cost about $55,400,000 this year and such a payment on stripper production would amount to about $78,750,000, or a total of $134,190,000. An overall increase, he declared, would cost the government alone, on its oil purchase, not less than $175,000,000 and would cost the public, additionally, $350,000,000.

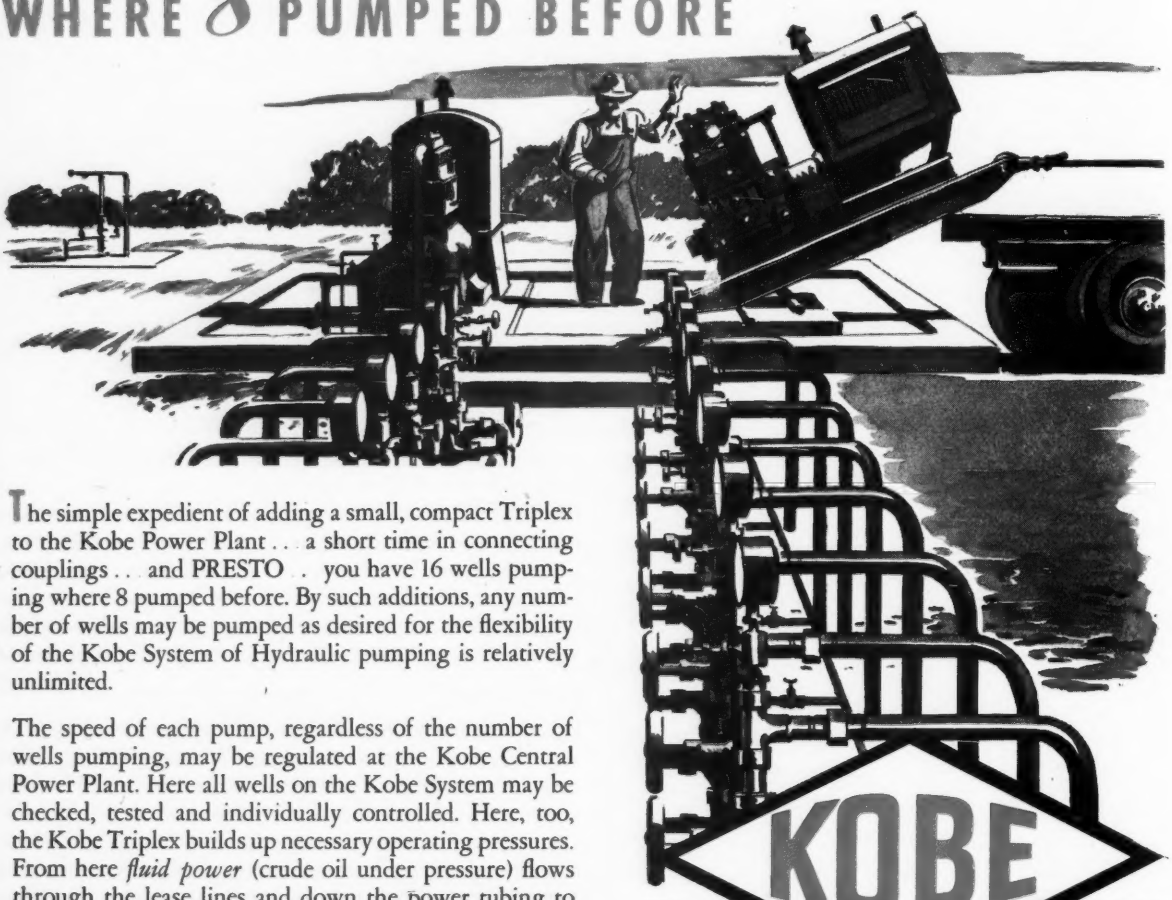
Bowles declared that if the oil industry were losing money under present prices there might be a reason for an overall price increase but under the circumstances "the only sound policy will be to confine inducements to the people who need to be induced."

The petroleum industry has continued to oppose strenuously the subsidy idea. As far as subsidies for stripper production are concerned it is argued that it would be impossible to define a stripper well; that subsidies would likely involve a gross misuse of government money, a huge bureaucracy, and eventually the destruction of free enterprise. Independent producers have taken the position that any program of price relief must cover new production and secondary recovery as well as stripper wells and preferably, of course, should cover all production, which is what the industry as a whole has consistently maintained over the past two years.

Still a factor in the whole price situation is the Disney bill to raise crude oil price ceilings. Hearings on the bill are pending before the Senate banking and currency committee, but at this writing no date for the hearings has been set.

That is about the way matters stand on the controversy which has been almost continuously in the public prints since Pearl Harbor. In view of recent developments it seems likely that the debate will rise in tempo and become more acrimonious in coming weeks. Thus far the industry has maintained a strong unified position for a general increase. It is not unlikely, however, that attempts may be made to divide the industry against itself. There are several reasons why certain elements in the Administration would like to see just this happen. This is something that should be borne in mind and guarded against as day-to-day developments occur.

NOW *16 will pump* WHERE *8* PUMPED BEFORE



The simple expedient of adding a small, compact Triplex to the Kobe Power Plant . . a short time in connecting couplings . . and PRESTO . you have 16 wells pumping where 8 pumped before. By such additions, any number of wells may be pumped as desired for the flexibility of the Kobe System of Hydraulic pumping is relatively unlimited.

The speed of each pump, regardless of the number of wells pumping, may be regulated at the Kobe Central Power Plant. Here all wells on the Kobe System may be checked, tested and individually controlled. Here, too, the Kobe Triplex builds up necessary operating pressures. From here *fluid power* (crude oil under pressure) flows through the lease lines and down the power tubing to the places where the work is to be done . . at the pumps down in the well. This important advantage, providing a simple method of greatly increasing lease pumping capacity is illustrative of the varied production possibilities of Kobe *fluid power*. Any Kobe representative will be glad to present the facts why more and more producers recognize Kobe as the Pumping System which has the advantages of the future.

PUMP THE MODERN WAY...USE KOBE

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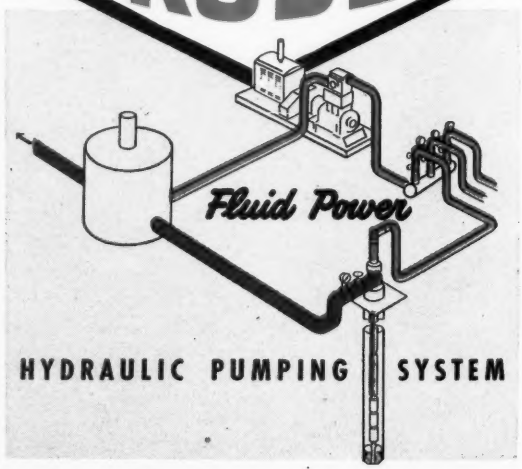

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Carrington King

Reports From Washington

The Saudi Arabia pipeline and related subjects stole the show completely from other news of national interest this month, as Petroleum Administrator Ickes and Petroleum Industry War Council effected a head on collision on the question of whether the U. S. Government should be permitted to construct a duplicate of the "big inch" from the Persian Gulf to the Mediterranean sea.

After several weeks of speculation, the blow-off came March 2, when Ickes' Thursday press conference was followed, within an hour, by a second press conference called by William R. Boyd, Jr., president of the American Petroleum Institute and chairman of the PIWC.

At the moment, the whole issue boils down to two separate points of view—one held by the oil industry, and the other subscribed to by most Government officials—on the importance of the project to our international relations and the possibility it might "put the Government in the oil business".

President Roosevelt, incidentally, appeared to line up with sponsors of the pipeline when he expressed concern about the future oil supply of this country,—not in the next five or 10 years, but in the next 50 years. Criticism of the 1200-mile pipeline involves the question of supplies, he told a press conference,—a question which he said was largely of fact.

Further complications result from Ickes' attitude that the pipeline project is important to the prosecution of the war, while industry representatives seemingly consider it a post-war matter. The line, if approved, will take an estimated two years to construct.

The Government will not be entering the oil business, if it undertakes the financing of the $135,000,000 pipeline, Ickes told his press conference. Construction of the Panama Canal "didn't put the Government in the transportation business," he reminded reporters.

Taking the attitude the war against Japan may last longer than many people now believe, the Petroleum Administrator said that "no one can deny" the proposed pipeline would be useful to this war if hostilities are still in effect at the time of the line's completion.

"I don't think we are doing the right thing by ourselves, without pressing forward in all directions," he told reporters.

Directly opposed to Ickes' views was the attitude of four industry representatives who were the central figures at an unprecedented press conference held at PIWC headquarters.

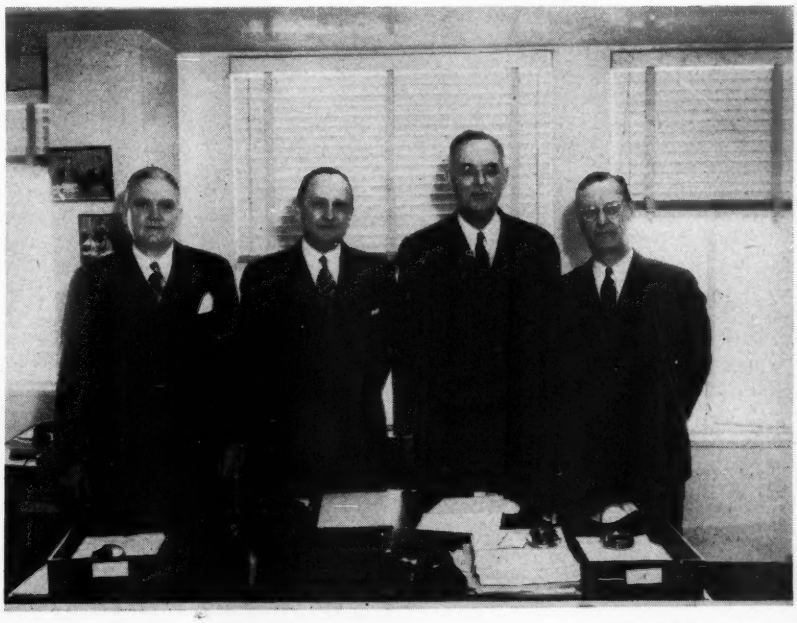
John A. Brown, president of the Socony Vacuum Co., Inc., and chairman of the Council's National Oil Policy Committee; President Boyd; George A. Hill, Jr., president of Houston Oil Co. of Texas, and Ralph T. Zook, president of the Independent Petroleum Association of America, warned that the Saudi Arabia pipeline was the "opening wedge" to put the Government in the oil business and made dire predictions about the international repercussions that might be expected if the U. S. carried out the project.

Oddly enough, the relatively harmonious relations that have existed between Ickes and the industry seemed unaffected by the violent conflict of opinions over Saudi Arabia.

"It's an honest difference of opinion," Ickes explained. "I don't think there is the slightest breach between me and the PIWC,—either personally, as Secretary of the Interior, or as Petroleum Administrator."

"The Council and the industry are 100 percent behind the Petroleum Administrator," said Brown, adding that the controversy "will have no effect on our complete cooperation with Ickes".

Nevertheless, the PIWC—both in a new resolution adopted at the March meeting and at the press conference——insisted they wanted to



—Photo by Ankers.

Left to right: Geo. A. Hill, Jr., Wm. R. Boyd, Jr., John A. Brown, and Ralph T. Zook.

There is No Substitute for Experience

ONLY by actually building a model ship can a boy get the experience and knowledge of the old sailor—to appreciate the qualities and performance of good materials. Similarly, only by the same method—*actual use*—can you learn to recognize the qualities of Hycar synthetic rubbers—the very qualities you want in resilient materials.

Hycar is a versatile synthetic rubber—completely resistant to petroleum products of all kinds. It has an operating range from −65° to +250° F. and an abrasion resistance 50% greater than natural rubber. Unlike many other resilient materials, Hycar has a minimum tendency to cold flow after taking the initial deformation, even at elevated temperatures. And it can be tailored to fit the job because oil-swell can be held to ±1%, or even to zero.

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Learn by actual experience by asking your supplier to furnish experimental parts made for tests in your own applications. Experience you gain now will reduce operating costs later. *Hycar Chemical Co., Akron 8, Ohio.*

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see Petroleum Reserves Corp. (the Government agency which would supervise construction of the pipeline) "pass out of the picture completely". The pipeline itself was denounced by Brown as a "breeder of trouble . . . and an invasion of the sovereignty of other nations".

Declaring construction of the line is, by admission, "not a war measure," Brown warned that the project therefore becomes a "permanent United States policy."

His contention that PRC had "no right, morally or legally" to embark on the pipeline project was echoed by Hill, who commented on the fact the agency had a "two-year life, and a 50-year commitment".

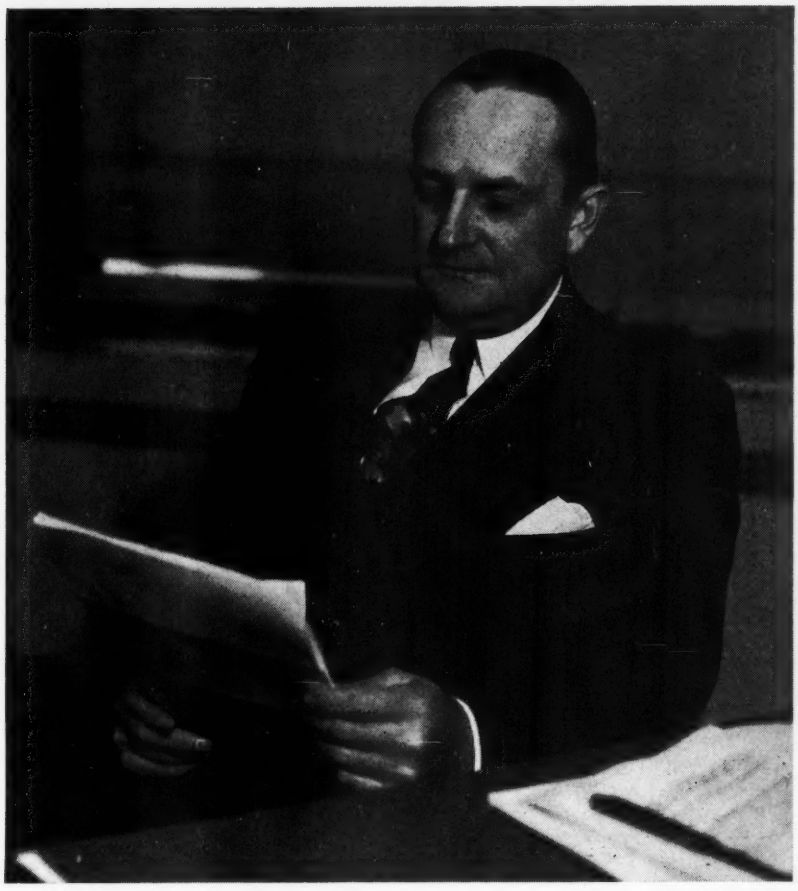
Independents joined up with the majors in denouncing the pipeline proposal. Explaining the independents "can take care of themselves in a rough-and-tumble with the big oil companies," Ralph Zook, IPAA president, added that this no longer would be possible "if the Government was going to put up the money" for a line that will benefit companies with Saudi Arabian interests.

Zook also protested against foreign operations while "development of oil within our own boundaries has been hampered". He said that the increase from 400,000 to 700,000 B/D that will occur if the pipeline is placed in use will cause Iraq and Iran to want to produce more crude and will have a similar effect on Caribbean production.

The possibility that our relations with South America would be harmed by the Saudi Arabia project was brought up by Brown, who pointed out that "all countries resent foreign intervention".

In its anti-PRC, anti-pipeline resolution, the PIWC said:

"The contract assumes, if it does not commit the United States and its Nationals to, marketing a large additional amount of oil to be produced from the Persian Gulf Fields in competition with other world sources of supply. It will have a serious effect on exports from South America and the United States, and may create ill feeling with our South American neighbors. If such a result arose from private company action these countries could not feel aggrieved, but when their economics are adversely affected by direct and unnecessary action on the part of the United States Government itself, they will undoubtedly feel that they have a real grievance.



Wm. R. Boyd, Jr., President American Petroleum Institute and Chairman of PIWC.

. . . "Direct participation by the Government of the United States in a pipeline system traversing the territory of three foreign nations can easily lead to international misunderstandings and pave the way to a future war through the involvement of our national honor. Certainly such a project with all of its implications should be submitted for the approval of Congress with ample time for thoughtful consideration."

The resolution—finding the project "against the interest of the people of the United States and all the American oil industry" and asking that PRC be dissolved—was adopted unanimously, except for representatives of Standard Oil Co. of California, the Texas Co., Gulf Oil Corp. and Shell Oil, who refrained from voting.

* * *

Into the weighty controversy over Saudi Arabian pipeline project came a touch of comedy, when Petroleum Administrator Ickes and James A. Moffett, former oil executive, engaged in a brisk exchange of insults that made the front pages of the Eastern papers.

From New York, "Jimmy" Moffett —who resigned last fall as Chairman of the board of the California Texas Oil Co., Ltd., and Bahrein Petroleum Co., Inc.—denounced the Saudi Arabia deal as the "biggest scandal I've ever seen" and called for Mr. Ickes' removal from office.

At his March 2 press conference, Ickes slapped back with a description of Moffett as a "playboy whom it is difficult to take seriously . . . (who is) careless with facts, and way off base in his conclusions."

Moffett has "never felt very happy" since Ickes refused to put him in charge of petroleum matters during the old NRA days, the Petroleum Administrator explained.

"I didn't think he rated a second—or third-rate job on the staff,"

he added. ". . . Jimmy hasn't anything to do now except run up to New York and talk about things he knows nothing about."

From New York, Moffett—whom Ickes further described as "one whom nobody in the oil industry takes seriously"—accused the Petroleum Administrator of again resorting to "his customary method of besmirching, the only language he knows and his customary stock in trade."

* * *

The Petroleum Administrator, the PIWC and Jimmy Moffett having expressed themselves on the Middle Eastern pipeline matter, Washington now is waiting for the start of hearings by a super-special Senate committee which plans to investigate all phases of the oil industry,—with special emphasis on the foreign oil situation.

A tentative line-up for the nine-man group — comprising two men each from the powerful Commerce, Interstate Commerce, Public Lands and Foreign Relations Committees, plus one member to be appointed by Vice President Wallace —is as follows:

From Commerce: Senators Francis Maloney (D., Conn.), and Owen Brewster (R., Me.).

From Interstate Commerce: Senators Edwin C. Johnson (D., Colo.) and E. H. Moore (R., Okla.).

From Public Lands: Senators Joseph C. O'Mahoney (D., Wyo.) and Chan Gurney (R., S. Dak.).

From Foreign Relations: Senators Tom Connally (D., Tex.) and James J. Davis (R., Pa.).

Some of the names were said to be subject to change, with the possibility that Chairman Carl A. Hatch (D., N. Mex.) of the Public Lands Committee may decide to serve in place of Gurney. It was generally anticipated, however, that the committee will be appointed within the next few days and that the Saudi Arabia pipeline controversy would be the first item on the agenda.

* * *

Just a few more paragraphs on that pipeline:

It has been estimated that American oil companies with concessions in Arabia and Kuwait would spend approximately $200,000,000 in connection with the proposed $135,000,000 pipeline.

Arabian-American Oil Co. (owned by Standard of California and the Texas Co.) is said to be ready to spend $50,000,000 in the next two years on exploration, drilling and construction of feeder lines to the pipeline and an additional $62,000,000 on refining facilities at the Mediterranean terminus of the pipeline.

Gulf Oil also is planning on construction of a Mediterranean refinery and exploration and drilling on its concession which is jointly owned with the Anglo-Iranian Oil Co.

An $8,000,000 expenditure for the construction of a permanent city at Ras Tanura, Saudi Arabia, also is part of the planned expansion.

* * *

With the Eastern press suddenly becoming "pipeline conscious" stories about a pipeline to cross the Isthmus of Tehuantepec, Mex., to supply the Pacific Coast blossomed forth in certain newspapers.

These reports were promptly spiked by Deputy Petroleum Administrator Ralph K. Davies, who said that "no such project" had been approved by the Petroleum Administration for War, nor had PAW been notified by the Army or the Navy of any such intent. Davies' denial was supplemented by Ickes, who assured the press he "hadn't heard a word about Mexican pipelines."

* * *

While oil men have been running in circles over the Middle Eastern developments, Standard of California has been marking time for the House Naval Affairs Committee to start hearings which, presumably, will decide once and for all whether the company will be permitted to continue operations under a "business agreement" with the Navy Department in the Elk Hills Reserve.

Legislation authorizing the Navy to enter into a contract with Standard has been cleared by the Bureau of the Budget and "is now waiting to go up to the Hill," CALIFORNIA OIL WORLD was told by a Navy Department official.

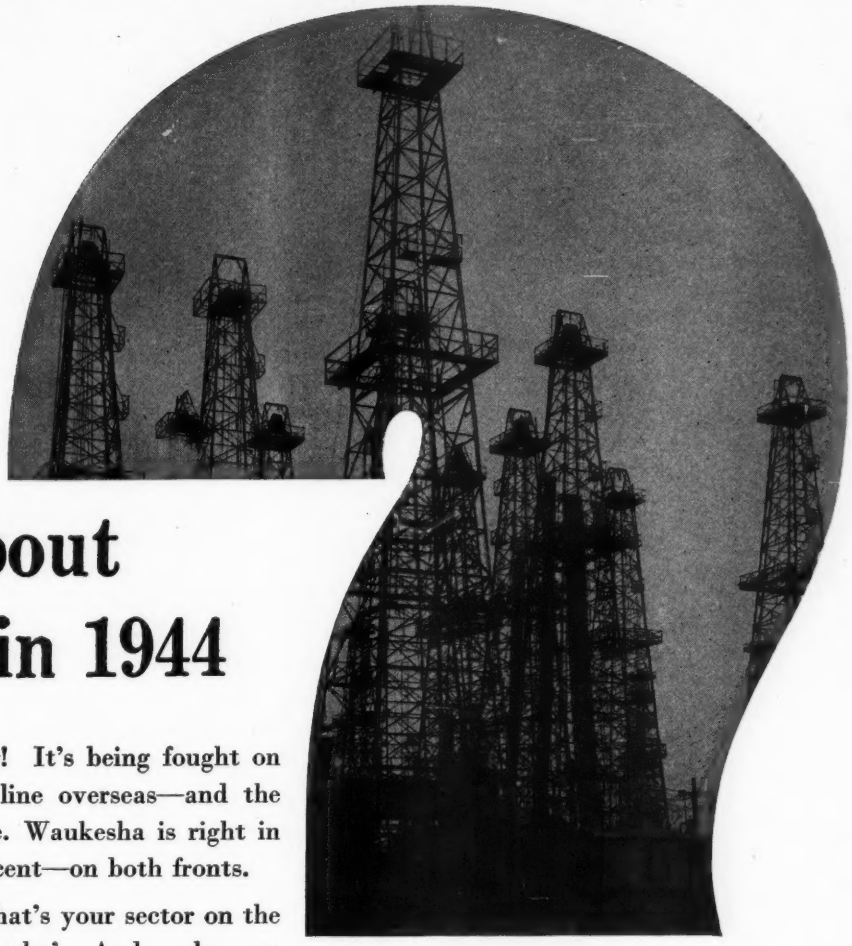
A "short opinion" from the Department of Justice is presently holding up the bill,—but this opinion involves only a technical and non-controversial point in the legislation.

Whether Standard will lose its rich holdings in Naval Reserve No. 1, through condemnation proceed-

(*Continued on Page* 14)

—Photo by Ankers.

Left to right: Geo. A. Hill; Wm. R. Boyd, Jr., John Brown, Russell Brown (Counsel for IPAA); Ralph Zook, and Joe Dwyer (Boyd's Man Friday).



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• Oil is ammunition! That's your sector on the battle lines—and Waukesha's. And, unless we pull together, the battle won't be won.

• This means, briefly—that you and other oil field engine users must tell us *now* approximately *how many* Waukesha Oil Field Engines you'll need this year—and when you want them.

• **If you can't place an order—at least estimate your future needs.**

• On the basis of your orders and estimated needs for this year, Waukesha is now planning its future production schedules.

• Will you give us this vital-to-victory information *now?*

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The Essential Phases of Mechanical Draft Tower Design and Operation

By L. T. Mart, The Marley Co., Inc.
Presented before the CNGA
Regular Monthly Meeting.

During the past decade there has developed a definite trend from atmospheric to mechanical draft equipment. The author classifies types of cooling systems and describes at considerable length the changes and improvements which have created this trend.

Many styles of cooling systems exist but they can be classed in three general groups. These are the spray pond, the atmospheric deck or tray type of tower and the mechanical draft. The third can be either of the forced or induced draft style. The total annual volume of business of the established manufacturers during normal times probably would not exceed three to four million dollars. As a war time business, however, the water cooling industry has expanded to an annual volume of probably fifteen to twenty million dollars. These figures include the selling price of the cooling systems delivered and installed but do not include cost of foundations, pumps, piping or other auxiliaries entering into the total cost of a cooling system.

Water cooling equipment has played a very important war role as most defense plants have heat dissipation problems and the need for water cooling equipment goes hand in hand with new plant construction. Many large installations are being made for high octane gasoline, synthetic rubber, ordnance, natural gasoline, and for steam power plants. Smaller installations include oil engine jacket cooling, refrigeration, compressor cooling and many miscellaneous uses.

During the early twenties most water cooling systems were of the atmospheric design, the business being evenly divided between spray ponds and deck type towers. In general, mechanical draft towers were used only when atmospheric equipment could not be utilized, usually because of space limitations. Early mechanical draft towers had relatively high initial cost, high maintenance or operating cost and high power consumption, thus making them unattractive from an economical standpoint. Other objections included unsightliness, serious drift loss and frequently excessive noise due to high speed fans.

Influence of Air Conditioning

The requirements of air conditioning during the early thirties had a great influence toward the development of the modern mechanical draft tower. As this industry grew it became more and more apparent that existing atmospheric cooling equipment when located on the roofs of downtown office buildings was satisfactory, inasmuch as atmospheric equipment operates successfully only under conditions of good breeze both as to velocity and direction. Drift loss was objectionable and maintenance to roofs was usually excessive. It thus became necessary to develop a greatly improved cooling system as compared to anything then in use.

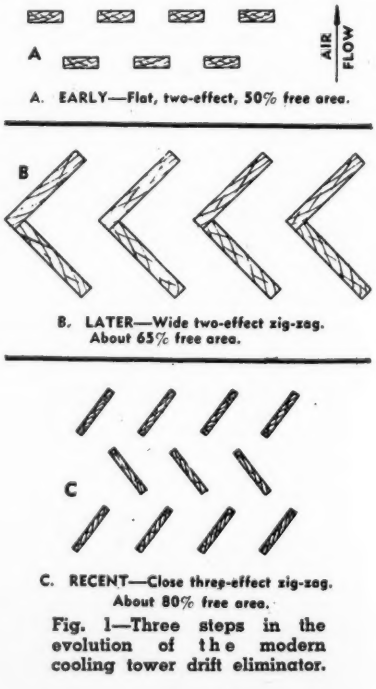
Air conditioning equipment must have water cooling towers which will handle maximum load under hottest weather conditions and regardless of wind velocities. Only mechanical draft will meet these conditions but early designs were far from satisfactory. To meet this unusual demand many improvements were made by the leading manufacturers of forced draft towers and after several years of continuously improving and modernizing, this product became very popular. Mechanical draft towers are now attractive in appearance and will give long life, low maintenance and dependable service. Weight and cost have been reduced and objectionable drift eliminated.

Improvements

An early step was the application of drift eliminators to prevent moisture carry over. Several styles were introduced, many changes and improvements were made. A close spaced triple effect eliminator of modern design was perfected which practically eliminated all free moisture carry over from the towers. It is now standard equipment with several manufacturers. (See Fig. 1.)

Most units of early design were equipped with a single wood casing and without exception these casings leaked very badly, thus having an objectionable external appearance. The main framework or columns were on the outside and these contributed to unsightliness. The practice of double casing cooling towers using two wood casings with an air space between was introduced and has since become standard design with most manufacturers. The inner casing still leaks, as formerly, but the leakage drains direct to the water basin and the outer casing remains practically dry. The outer casing is also applied outside of the main framework thus giving the cooling tower a smooth, neat, external appearance.

In early designs of mechanical draft towers the fan shafts extended through the tower from side to side with two fans, one mounted at each end thereof. The fans were



A. EARLY—Flat, two-effect, 50% free area.

B. LATER—Wide two-effect zig-zag. About 65% free area.

C. RECENT—Close three-effect zig-zag. About 80% free area.

Fig. 1—Three steps in the evolution of the modern cooling tower drift eliminator.

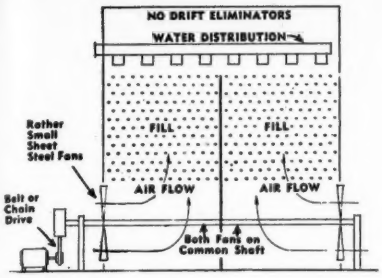


Fig. 2—Cross section of a typical early forced draft cooling tower.

of sheet steel, highly corrosive, difficult to balance, of fairly short life and having high maintenance cost. The shafts upon which the fans were mounted also required a number of bearings for support, several of which were within the tower and within the path of the falling water. Early speed reducers between the fan shafts and prime movers were frequently of chain and sprockets or of designs difficult to adjust and having high maintenance cost, especially where operated in the open air and exposed to all weather condition. (See Fig. 2.).

Among the important factors affecting cost was the change in overall dimensions of towers. Early designs were fairly narrow and high with pumping heads of 30 to 35 feet. Present designs are of greatly reduced height, accomplished by increasing the frame width and by lowering the cooling chamber within the tower. These changes over a period of years have resulted in a reduction in total casing cost of probably 25 to 30%. The cost of internal wind bracing has likewise been cut to less than one-half that previously required, and the pumping heads have been reduced to approximately 20 to 30 feet on even the very largest of towers. (See Fig. 3.)

Early fan wheels were mounted to the sides of towers, with a fan ring usually consisting of a round

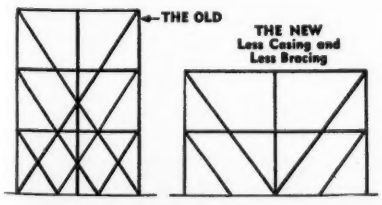


Fig. 3—Structural economy through new proportioning, lower and wider.

orifice or hole cut in the tower casing. Modern designs include fan inlet rings which are highly flared or venturi in shape. The air is admitted to the fan wheel under much more efficient conditions, eddy currents are eliminated and much quieter operation can be secured. Fan power is thus greatly reduced.

Following the old multi-blade sheet steel disc type fan there was introduced the one piece two bladed high speed propeller fan. The next step was a multi-bladed propeller type fan of air foil section having adjustable pitch, permitting adjustment of fan input horsepower. Fans of this design and having flared inlets are standard today with most reliable cooling tower manufacturers. (See Fig. 4.)

Early designs usually located the motor and speed reducer mechanism in the air flow stream. Modern design places the motor outside of the air stream is a much more protected and accessible location. Speed reducers are fully enclosed in noncorrosive cast boxes or housings resulting in continued long life with little or no maintenance. Spiral bevel gears are preferred for their quietness and high efficiency. Fans are usually mounted directly to the speed reducer shaft. The fan blades have adjustable pitch, are of noncorrosive materials and of long life. Air foil section provides high efficiency and enables operation with reduced fan speeds and quietness.

Many improvements have been made in the efficiency of the fill media or slats over which the water falls and through which the cooling is accomplished. The tendency is from large triangular slats to smaller flat ones more advantageously spaced and having a larger free opening between the slats. This results in a reduction of draft loss with increased air velocities possible and also with an increased cooling efficiency of the cooling chamber. The tendency is to also support slats on closer centers and good construction requires that fill slats be supported on 15 to 18 ft. centers under all conditions to eliminate sagging.

The use of what is known as the Teco ring at important timber structural points is now accepted best

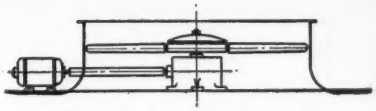


Fig. 4—Fan assembly of approved modern design with flared inlet ring and motor outside of air stream.

practice. The development of full strength in a timber joint is practically impossible or becomes a very expensive procedure when only bolts are used, but by the use of the Teco ring the correct strength can be accomplished. Use of large non-corrosive washers on bolts is also important in framework construction. (See Fig. 5.)

Early designs of cooling towers did not provide proper structural strength to resist wind or in some cases earthquake stresses. Little was standardized about the mechanical properties of wood and towers normally were designed to withstand slight wind pressures. Published data of the U. S. Forest Products Laboratory at Madison, Wisconsin, is today the standard of design, and most reliable manufacturers build a product which is guaranteed to withstand a wind pressure of 30 pounds per square inch.

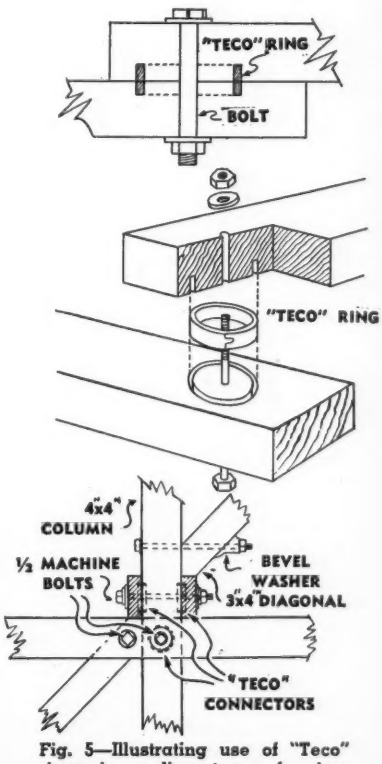


Fig. 5—Illustrating use of "Teco" rings in cooling tower framing.

Fig. 6—New cooling tower filling locked together with mortises and slots saves nails and increases strength and wetted surface.

This corresponds to approximately a 100 mile per hour wind.

A new, unique and generally improved fill slot arrangement has been introduced recently which enables the entire fill material to be installed within a tower framework without the use of nails. This also increases the amount of wetted surface. (See Fig. 6.)

During war times, with copper or copper alloy nails denied the cooling tower manufacturers, the nailless feature is quite important since the small nails commonly used in the assembly of cooling tower slots have a probable life of only two to three years when of steel even though galvanized. Reliable cooling tower manufacturers for a long period of years have used or recommended copper alloy nails for this purpose. The new nailless mortised fill with slots supported on very close centers results in a much stronger construction than has previously been accomplished. This feature is of great importance in northern locations where cooling towers must withstand heavy ice loads during winter operation.

Forced Draft Design Inadequate

Many manufacturers for years offered only the forced draft design but the trend in recent years is to induced draft. This can be easily explained. When forced draft towers for roof locations are located near surrounding buildings the fan noise directed against office windows becomes objectionable. In induced draft design this does not occur. In forced draft design the fans blow the air horizontally across the tower and then force it upwards with considerable turbulence and irregularity of flow. With induced draft towers air enters uniformly around the lower tower sides and is thence drawn upward with better control and distribution and at more uniform velocity.

Recirculation of the hot humid outgoing air downward and back into the tower is the greatest single factor resulting in the trend from forced draft towers. This condition becomes serious on multiple fan towers and in general, the larger the tower the worse the condition. Loss of tower cooling capacity can easily average five to eight per cent and frequently exceeds ten per cent for short periods. With induced draft the air discharges vertically at high velocity and dissipates at altitudes well away from the fresh air intakes. (See Fig. 7.)

Serious icing conditions with forced draft fans can be caused by the moisture laden air resulting in much damage or breakage to mechanical equipment. Induced draft fans cannot ice up while in service as outgoing air is always above freezing temperature while water flows through the tower.

It is important that a cooling tower have a water distributing system which is flexible in design, distributing the water to all parts of the tower regardless of volume and having the system accessible for maintenance and inspection at all times. Conventional vertical flow towers do not accomplish this result and it is extremely difficult to control water distribution within them. Towers in which the water distributing system is accessible and conveniently adjustable are therefore better adapted to services requiring operating flexibility.

With the coming of the war program many large multiple fan cooling towers were required, frequently having as many as 40 to 50 individual fans and motors. A practical need obviously was a design permitting of much larger and fewer fans. This was difficult to accomplish in conventional vertical air flow towers.

The Horizontal Flow Principle

A design accomplishing all of these improved mechanical features has been created in what is known as the "Double-Flow" Tower. In the Double-Flow tower air flows horizontally through two separate cooling chambers afterward passing through an inclined drift eliminator and thence upward to a single large fan above. By the proper spacing of the two cooling chambers there is practically no limit to the diameter of fans which can be used, and because of air flowing horizontally the water distributing system may be located above the cooling medium and open to inspection and maintenance. (See Figs. 8 and 9.)

In the horizontal flow tower illustrated the draft loss is greatly reduced when compared to any cooling tower using the vertical air flow principle, there being a much greater free area than in the conventional design and the draft loss through this portion is also reduced. Large diameter fans with flared or venturi shaped inlet rings are provided to reduce fan draft loss. Total draft loss is very low and a material reduction in fan horsepower is obtained.

The larger fans and motors permit larger cells or units thus reducing the number of individual

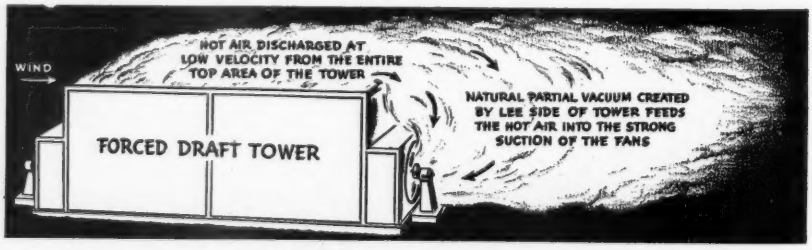

WIND
HOT AIR DISCHARGED AT LOW VELOCITY FROM THE ENTIRE TOP AREA OF THE TOWER
FORCED DRAFT TOWER
NATURAL PARTIAL VACUUM CREATED BY LEE SIDE OF TOWER FEEDS THE HOT AIR INTO THE STRONG SUCTION OF THE FANS

Fig. 7—"Recirculation" is an undesirable condition peculiar to forced draft towers.

Yes, sir, that's right! One of the many advantages of the Patterson-Ballagh Pipe Wiper is protection against the dropping of small articles such as broken slips, tong dies, hammers, chisels, and other tools which are thereafter a constant fishing hazard. Another contribution of these Patterson-Ballagh Pipe Wipers is the elimination of wash water When the pipe is pulled from the hole, the mud or oil is squeegeed so completely that mud dilution is no longer a problem. With mud weight material hard to get, the value of this can be readily appreciated. Frequently, the saving in one day will pay for the wiper. These wipers have no exposed metal to spark; rig is safer as floor is dry; tubing and drill pipe is easier to inspect; the crew work and feel better when the pipe and floor are dry.

Many thousands of Patterson-Ballagh Pipe Wipers are in use throughout the world. It will pay you to investigate now. We will be glad to send you further information. Now made of PBX, the new oil resisting synthetic.

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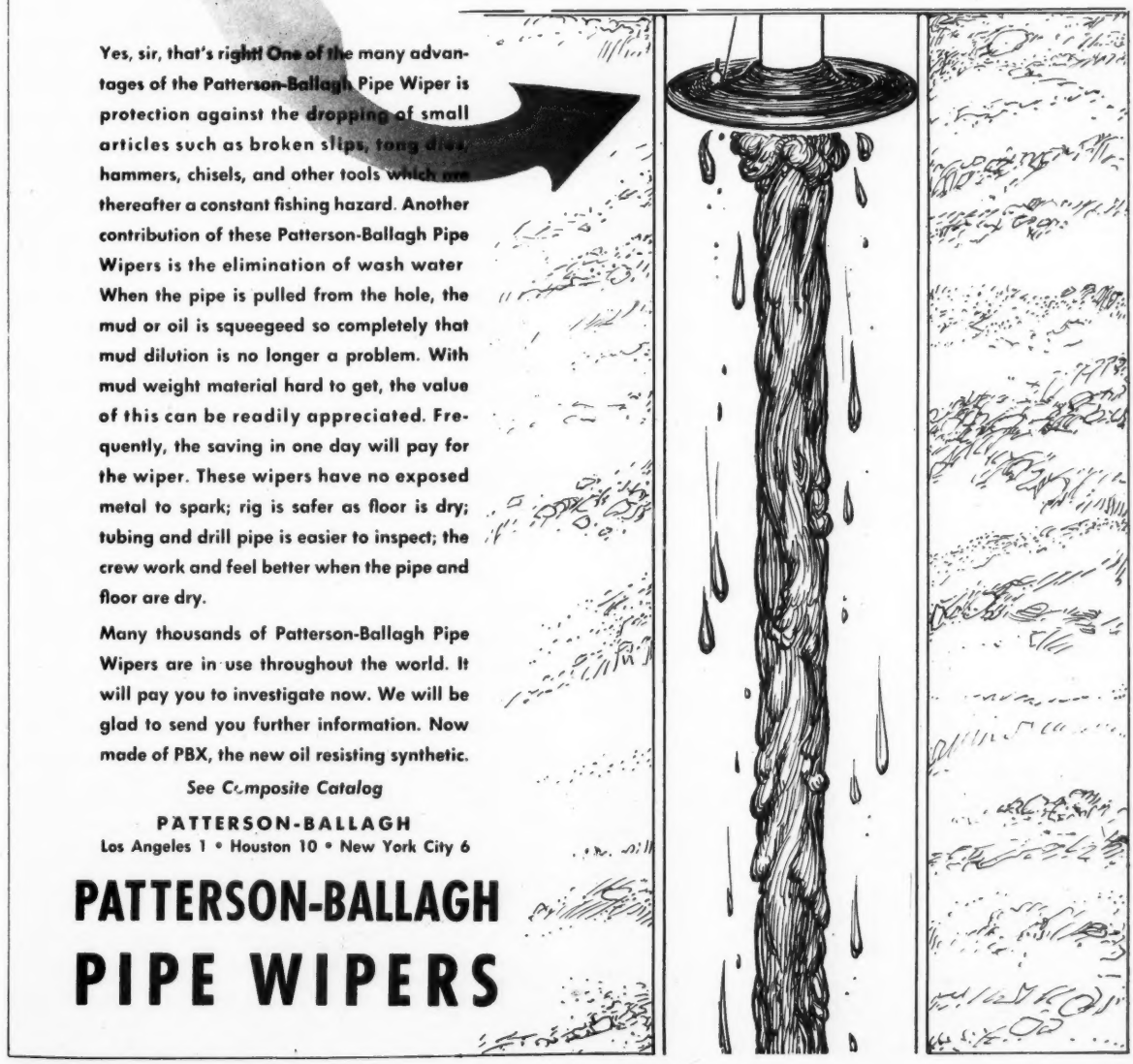


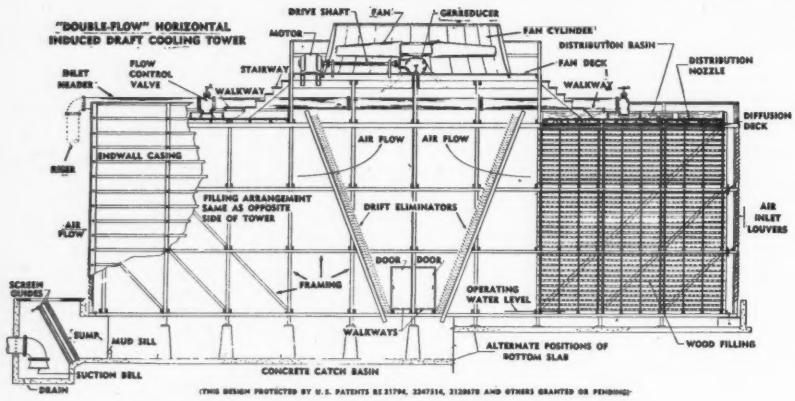


Fig. 8—Cross section of a "Double-Flow" cooling tower. Solid partitions extend down the center of the tower lengthwise directly beneath the fans and crosswise between each pair of cooling chambers.

water supply inlets, and also reducing the amount of electrical wiring, conduit and shorter connections to the tower. Flexibility of operation is greatly improved. The horizontal air flow principle has met with such success that it is now available in a complete range of sizes and styles.

For the gasoline industry the Double-Flow tower has unusual appeal in that a double row of atmospheric heat exchangers can be set below the tower main water basin and by the introduction of a patented air by-pass arrangement, air can be pulled direct from the coil shed chamber to the fans without passing through the cooling tower chamber. In practically all other towers whether atmospheric or of the mechanical draft design, not having this controlled by-pass, hot humid air from the coil cooling section is permitted to enter the cooling tower proper, thus the in-going air wet bulb to the tower is raised and the tower efficiency is lowered. Many installations of this style of tower are already in operation and attest to this principle.

It is recommended that fans be equipped with two speed motors, enabling the operator to run fans at half speed during the spring and fall months and frequently permitting a complete shutdown during the winter months. Fan horsepower at half speed is approximately 1/7 to 1/8 that required at full speed, and several installations in the oil and gas industry have proven that the annual power consumption seldom exceeds 40 to 50% of that required under full load summertime conditions. Many installations are operating with gas engines and steam turbines for fan drive.

Mechanical Draft Advantages

It is sometimes said the mechanical draft tower has high operating expense and that the atmospheric is preferred if costs are to be held to a minimum. It should be pointed out that the actual water pumping head of mechanical draft towers is usually approximately 50 to 60% of that required to operate atmospheric towers, and the saving in water pumping head can be used to overcome in part the cost of fan power. The following case will serve to illustrate.

If we assume towers of 5,000 gallons per minute capacity cooling from 105° to 85° with a 70° wet bulb we would have for the deck type tower probably about 36′ pumping head and about sixty horsepower. The mechanical draft tower for the same condition would have about 20′ pumping head. It would require 32.5 H.P. for pumping head and 55 H.P. for fans, or a total of 87.5 H.P. at full load. Year round operation would require sixty horsepower which equals the deck tower.

When considering the installation of atmospheric versus mechanical draft always consider the cost of external water supply piping. The mechanical draft unit being shorter requires less main header and less risers. Often with the mechanical draft tower the water can be introduced near the tower end, thus saving piping, valves and pumping power. Having little drift loss mechanical draft towers can frequently be located closer to the machinery or condensing units being served, thus reducing length and cost of water supply lines to and from the cooling tower. Pumping head, of course, is reduced as well. (See Fig. 10.)

Because of drift from atmospheric towers quite an area must frequently be provided along either side which cannot be used for any other purpose due to the condition of the ground during the high breeze and drift. Atmospheric towers are sometimes provided with clear spaces alongside of 200 to 300 feet, in width, although the modern units with reduced draft loss may not need this much space.

Total make-up water is least for the mechanical draft tower. Where

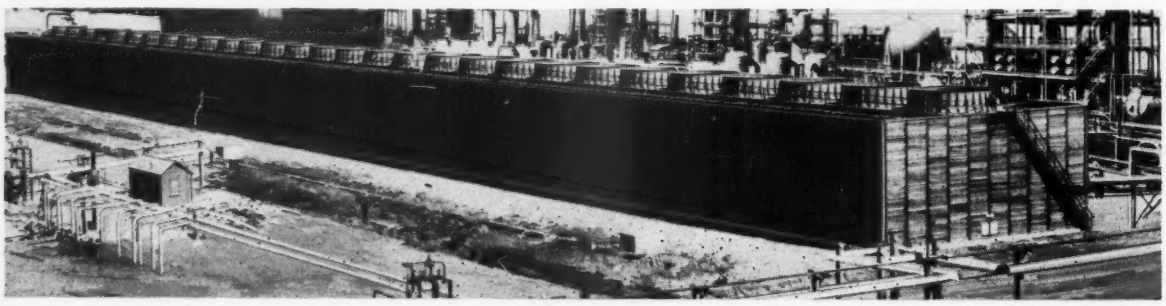


Fig. 9—A 29-fan "Double-Flow" tower, probably the largest-capacity single cooling tower installation in the country.

water is scarce the saving is important. Where water must be chemically treated, cost is less with mechanical draft and sometimes a smaller treating plant can be purchased. With mechanical draft the addition of make-up water is constant, whereas with atmospheric the rate of adding make-up water accelerates with wind velocity.

Deck type towers must be considered a greater operating hazard with higher insurance rates. Actual loss and damage records in hurricane or cyclone areas have clearly proven this point. With modern water treating methods delignification of wood must often be considered. Atmospheric towers with many parts alternately wet and dry are subject to far more rapid action. Serious delignification is not a factor with mechanical draft.

Probably the greatest operating asset of the mechanical draft type as compared to the atmospheric lies in its ability to cool water with a much more uniform approach to wet bulb temperature, thus giving controlled water temperatures and controlled production. Atmospheric equipment being subject to extreme variation and direction of wind, will cool with results obtained from mechanical draft only when exposed to favorable breezes. Whenever, wind velocity falls below a certain minimum or is from the wrong direction water temperatures rise rapidly. One typical installation is known to have been installed to cool from 115° to 85° with a 76° wet bulb and 4 mile wind. This tower is an unusually large one and there are periods almost daily in the summertime when the cold water temperature goes to approximately 103° even though the heat load handled by the tower is less than three-fourths of the guaranteed tower performance. The owner is not contentious about the tower, admitting that it meets guarantees under proper wind conditions, but nevertheless the user suffers each day at times with a water temperature of 15 to 18° above what would be obtained with mechanical draft equipment.

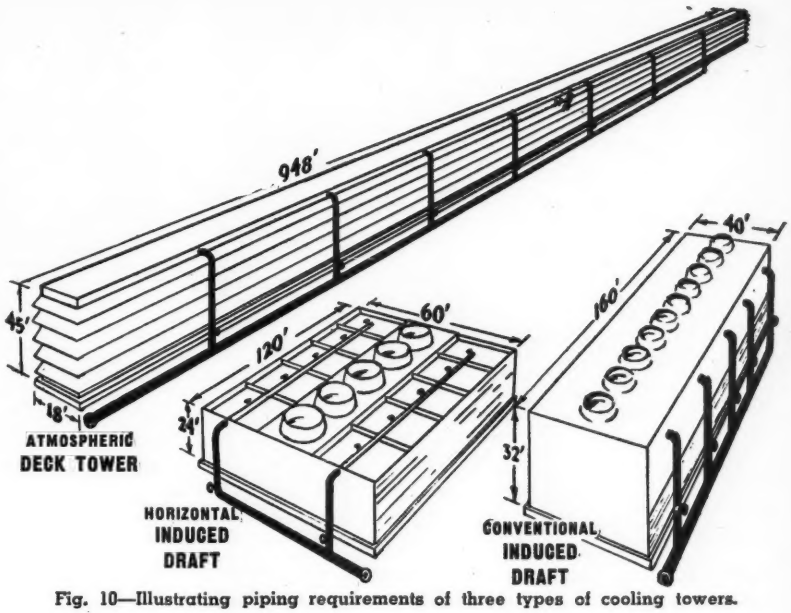


Fig. 10—Illustrating piping requirements of three types of cooling towers.

This case is cited merely as a specific example that a deck tower designed for any higher wind velocity than it will receive **at all times** cannot be considered a dependable auxiliary. When designed on the basis of a given wind velocity, a deck tower cannot maintain desired cold water temperatures with lower wind velocities or during calms nor when the wind is blowing lengthwise or obliquely to the tower. Hence, winds being unreliable both as to velocity and direction, a deck tower must be sized to deliver design performance with zero mph wind if it is to maintain uninterrupted efficiency comparable to a mechanical draft tower.

To state this same point in another way, if a proposed deck tower is rated on the basis of a 3 to 5 mph wind the **average** temperature of its cold water will not be as low as that from a mechanical draft tower for the same service. Hence, if the prospective purchaser is to draw a true comparison on a merit basis, such a deck tower should be specified to cool within 8° of the wet bulb at 3 to 5 mph wind as against a 10° approach for a mechanical draft tower. This higher allowable design cold water temperature for the mechanical draft tower will tend to compensate for the higher average temperatures from the deck tower, thus permitting a more honest comparison.

Whether the two types are contrasted by either of the above methods (zero mph wind for the deck tower or a higher allowable for the mechanical draft) the strong trend in cooling tower purchases shows most engineers conclude that mechanical draft is the best investment.

The progress of mechanical draft towers over a period of years can best be shown by the following table which compares dimensions, pumping head, horsepower, weight and prices.

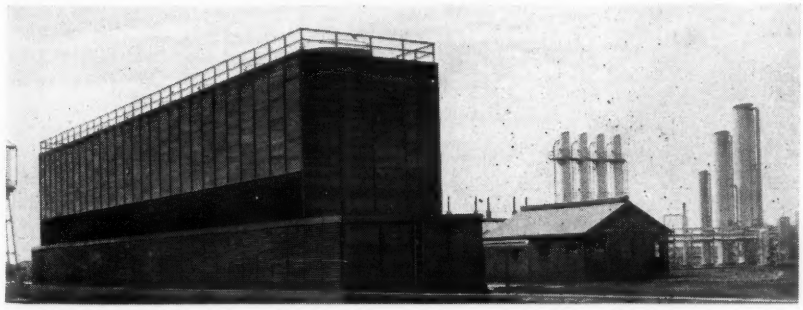


Fig. 11—A typical induced draft "SpraCoil" cooling tower in a recycling plant. This is a conventional induced draft tower equipped with a redistribution system to shower the cooled water evenly over atmospheric heat exchangers installed in the substructure.

PROGRESSIVE IMPROVEMENT AND DECLINING PRICES

Example: 20,000 Gallons Per Minute

Typical Towers for:	1925	1932	1941	1943
Dimensions—W x L.....	36'x220'	32'x240'	40'x240'	40'x210'
Height	40'	36'	30'	26'
Effective Area—Sq. Ft...	7,920	8,640	9,600	8,400
Fans—Number	22	14	10	7
Size	9'	12'	16'	18'
BHP—Total	560	460	384	350
Water Pumping Head...	32'	28'	24'	20'
Dry Weight lbs.	960,000	940,000	900,000	845,000
Price, delivered and erected	$78,000	$71,000	$67,000	$71,000
Price, based on pre-Pearl Harbor costs				$66,000

From the above table it will be noted that remarkable strides have been made in the development of mechanical draft towers, while atmospherics remain today with pumping heads, initial cost, maintenance, etc., very much the same as in 1925.

Many improvements in mechanical draft towers cannot be definitely evaluated in dollars and cents. These include improved and more dependable mechanical equipment, improved appearance, reduced maintenance and better general construction. Probably the best evidence is the fact that few users of water cooling equipment purchase mechanical draft and then go back to the atmospheric style even though they have previously used atmospheric towers. The purchase record is clear and decisive on this point.

George Schweinhard On Eastern Trip

Mr. George Schweinhard, president of Petroleum Equipment Co., is in the east attending a meeting of the Industrial Advisory Committee to the Petroleum Equipment Section of the Wholesale and Retail Trade Division of the War Production Board of which he is a member, representing the West Coast.

Wm. C. Brooks On Leave Of Absence

Wm. C. Brooks is now in Washington as a special assistant to Mr. F. A. Watts, Director of Materials, Petroleum Administration for War. Mr. Brooks' many friends in the California oil industry wish him well in his Washington venture, but are glad to know that his move to Washington is only temporary.

BUY WAR BONDS

Remove Preference Rating On Tool Joints

Tool joints now may be ordered from suppliers without obtaining preference ratings, the Petroleum Administration for War announced as it changed the requirement contained in Preference Rating Order P-98-b. Future procedure will be similar to that now used to procure rotary bits.

Petroleum Equipment Co. Announces Personnel Change

Mr. Glen Pitts is now manager of warehouse and field stores. Mr. Pitts attended U. C. L. A. and then went to work in the supply industry where for several years he occupied important positions with their field store organization. Later he specialized in tubular sales. Since going with the Petroleum Equipment Co. sales force he has, until his present promotion, worked in the various districts which they serve.

Mr. John J. Donnelly has been added to the sales staff of the machinery division. His particular duties will be to head up the sale of National "Ideal" equipment. Since graduating in engineering from the Carnegie Institute of Technology, Mr. Donnelly has had wide experience with oil field machinery, working in the Mid Continent and California fields.

Mr. Wm. A. McMullen has just been appointed assistant treasurer and credit manager. Mr. McMullen has had many years of experience in credits, particularly in the California petroleum industry.

Mr. H. H. Walter has also been added to the machinery division sales staff. Mr. Walter is an engineering graduate of Purdue University and since that time has had wide experience in engineering sales work.

WASHINGTON REPORTS

(*Continued from Page 6*)

ings, or whether the company will be permitted to continue present production of 15,000 B/D, will be the issue when the new legislation comes before the Naval Affairs Committee.

In the private opinion of some officials, the matter will ultimately be decided by the Joint Chiefs of Staff,—after hearing from the Petroleum Administration. If this should be the case, Standard might well be instructed to increase present production,—as Mr. Ickes has publicly stated that the California oil shortage could be eased if Standard's Elk Hills operations could be increased to 50,000 barrels daily.

* * *

With all the emphasis centered on foreign oil matters, these last few weeks, very little has been heard about crude prices, the domestic shortage, or the problem of rationing.

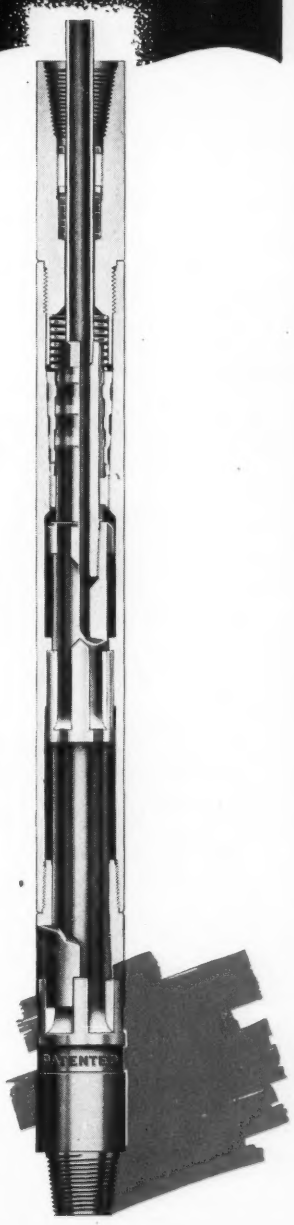
Representative "Wes" Disney, of Oklahoma, has not forgotten the need for a crude price increase, however, and recently charged the Senate with being "dutifully abiding" to the will of the Administration in stalling action on a House-approved bill that would, in effect, permit PAW to up the price by 35 cents a barrel.

The present price structure is making it impossible for independent operators to remain in business, Disney said, and is forcing them to sell out to the majors.

. . . And the Office of Price Administration, at last admitting its gasoline rationing system was facing a complete break-down because of black market operations, changed the form of all coupons, except A-coupons, from books to cardboard strips and proclaimed a nationwide enforcement drive to start March 6.

To trap enemy submarines and hold them by their "gills," gigantic steel nets, supported by floats, are used to protect harbor entrances. Telltale bubbles and the wash from propellers betray the trapped subs to patrol ships and planes. The nets are constructed near points of embarkation and when completed they are transferred aboard net-laying vessels to strategic spots.

HERE'S WHY A *Straight Pull* JAR SAFEGUARDS YOUR FISHING OPERATIONS



IF YOU tackle **any** type of fishing job where jars are used in the fishing string, there are **many** important advantages gained by using the Bowen **straight-pull** Fishing Jar . . . advantages that substantially reduce fishing time and safeguard other equipment in the hole. . . .

FOR EXAMPLE:

With the Bowen straight-pull jar there is never any risky twisting or turning of the fishing string for jar operation—just **straight upward pull** to deliver the blow, **straight lowering** for resetting!

With the Bowen straight-pull jar no dangerous torque loads are required for adjusting intensity of the blow. Instead, a simple sixth of a turn to the right increases pull required to trip the jar by one or two points—and you just reverse the procedure to decrease pull!

With the Bowen straight-pull jar you can safely use fishing tools that set and release on rotation of the string. There's no turning required for jar operation that might accidentally set or release an overshot, spear, socket or other similar releasing tool.

But these are only a few of the reasons why operators everywhere choose the Bowen Jar for all fishing operations . . . why it is the logical choice for safeguarding the toughest fishing operations **you** run up against. **Next time—call Bowen. 24 hour service in all active California fields.**

Bowen has prepared a valuable instruction manual for the Bowen Jar that will help you get more service, greater satisfaction, from this essential fishing tool. **Send for your copy today.**

BOWEN FISHING TOOL CO.
SANTA FE SPRINGS, CALIFORNIA
VENTURA - BAKERSFIELD - AVENAL - SANTA MARIA - CASPER, WYOMING

Report of the Committee on Petroleum Reserves, A.P.I.

The following report has been directed to the Board of Directors of the American Petroleum Institute by The Committee on Petroleum Reserves, J. Edgar Pew, chairman.

TO THE BOARD OF DIRECTORS,
AMERICAN PETROLEUM INSTITUTE:

The American Petroleum Institute's Committee on Petroleum Reserves herewith submits its report as of December 31, 1943.

The estimates in this report, as in all previous reports of this committee, refer solely to proved or blocked-out reserves of crude oil (including condensate) known to be recoverable under existing economic and operating conditions. Therefore, they do not include any estimate of:

(1) Oil under the unproved portions of partly developed fields;
(2) Oil in untested prospects;
(3) Oil that may be present in unknown prospects in regions believed to be generally favorable;
(4) Casinghead gasoline extracted at natural gasoline plants in moderately low-pressure fields;
(5) Oil that may become available by secondary-recovery methods from fields where such methods have not yet been applied;
(6) Oil that may become available through chemical processing of natural gas;
(7) Oil that can be synthetically recovered from oil shale, coal, or other substitutes.

The committee again wishes especially to stress the fact that its estimates of proved resources cannot be used as a measure of the rate at which these reserves can be produced with or without physical waste. Oil cannot be produced from the permeable rocks in which it occurs at any desired rate, because the flow of oil through the pores of the oil-bearing rocks is definitely controlled by physical factors of the reservoir. As a matter of fact, today's known oil can be recovered only over a period of many years and at gradually declining annual rates, as has been widely demonstrated by past performance under all kinds of operating conditions. For this reason, those who, through arbitrary division of the known reserves by any current rate of production or by any anticipated rate of consumption, try to estimate the life of proved reserves of oil, or the rate at which these reserves can be produced, are obviously using an incorrect method.

The committee estimates that the proved reserves of crude oil in the United States, as of December 31, 1943, amounted to 20,064,152,000 barrels. This estimate is derived as follows:

	Barrels	Barrels
Total proved reserves as of December 31, 1942		20,082,793,000
Extensions and revisions during 1943	1,202,368,000	
New reserves (new pools) discovered in 1943	282,418,000	
		1,484,786,000
Total proved reserves as of December 31, 1942, and new proved reserves added in 1943		21,567,579,000
Subtract production during 1943		1,503,427,000
Total proved reserves as of December 31, 1943		20,064,152,000
Decrease in reserves since December 31, 1942		18,641,000

These figures are the totals of the columns shown in Table 1 where the details are recorded by states. In column 1 of this table are the estimates of proved reserves reported by this committee as of December 31, 1942.

In column 2 are listed, for each state, the proved reserves added by extensions of pools only partly developed on January 1, 1943, and also revisions of proved reserves where increased knowledge of sand and recovery conditions made changes in earlier estimates necessary.

In column 3 are listed proved reserves discovered in new fields in 1943.

The production of crude oil during 1943 is shown in column 4. These production figures have been deducted from the sum of column 1, 2, and 3 to obtain the estimated proved reserves as of December 31, 1943, shown in Column 5.

It should be emphasized that the estimates in this report refer only to reserves proved by drilling and production performance. It is particularly important to understand this in the case of new discoveries which are seldom fully developed in the first year and in fact for several years thereafter. In this report estimates of newly-discovered oil, therefore, necessarily represents but a part of the oil reserves which may ultimately be assigned to the new reservoirs discovered each year. The total of new oil estimated in this way in any given year will be comparatively small and the total of new oil through extensions comparatively large. Again, as knowledge of the factors affecting production and well performance become available, and are studied, reserves in older fields can be estimated with greater precision and revised accordingly. Therefore, new discoveries, plus extensions, with whatever revisions are needed, are an estimated inventory of the new proved reserves.

For comparative purposes we append a summary tabulation (Table 2) of the overall figures contained

TABLE I

ESTIMATED PROVED PETROLEUM RESERVES IN THE UNITED STATES
(Barrels of 42 U. S. Gallons)
For proper understanding of this table, the text must be read.

	Proved Reserves as of (December 31, 1942)	Changes in Proved Reserves due to Extensions and Revisions during 1943	New Proved Reserves (new pools) Discovered in 1943*	Production During 1943 (estimated)	Proved Reserves as of December 31, 1943 (Columns 1+2+3 less Column 4)
	(1)	(2)	(3)	(4)	(5)
Arkansas	300,026,000	21,995,000	2,536,000	27,628,000	296,929,000
California	3,195,846,000	408,993,000	16,170,000	284,186,000	3,336,823,000
Colorado	39,443,000	7,996,000	-	2,328,000	45,111,000
Illinois	306,778,000	65,803,000	4,226,000	82,185,000	294,622,000
Indiana	31,773,000	4,258,000	272,000	5,264,000	31,039,000
Kansas	686,975,000	19,772,000	45,352,000	106,247,000	645,852,000
Kentucky	34,653,000	4,650,000	3,815,000	7,928,000	35,190,000
Louisiana	1,442,126,000	111,984,000	53,491,000	123,775,000	1,483,826,000
Michigan	63,843,000	6,187,000	5,900,000	20,682,000	55,248,000
Mississippi	40,897,000	14,397,000	2,468,000	18,890,000	38,872,000
Montana	85,558,000	30,123,000	200,000	7,824,000	108,057,000
Nebraska	2,177,000	- 523,000	-	654,000	1,000,000
New Mexico	677,497,000	13,801,000	1,140,000	38,457,000	653,981,000
New York	54,395,000	41,180,000	-	5,050,000	90,525,000
Ohio	35,021,000	- 600,000	1,527,000	3,305,000	32,643,000
Oklahoma	968,927,000	12,194,000	50,524,000	123,027,000	908,618,000
Pennsylvania	153,118,000	-	-	15,795,000	137,323,000
Texas	11,545,727,000	283,823,000	88,969,000	593,565,000	11,324,954,000
West Virginia	47,187,000	-	-	3,348,000	43,839,000
Wyoming	370,572,000	156,335,000	5,728,000	33,241,000	499,394,000
Miscellaneous**	254,000	-	100,000	48,000	306,000
Total United States	20,082,793,000	1,202,368,000	282,418,000	1,503,427,000	20,064,152,000

*Only a limited area is assigned to each new discovery even though the committee may believe that eventually a much larger area will produce, for in this report we are concerned only with actually proved reserves.
**Includes Florida, Missouri, Tennessee, Utah and Virginia.

TABLE 2

SUMMARY OF COMMITTEE'S ANNUAL REPORTS COVERING PERIOD 1937-1943
(Barrels of 42 U. S. Gallons)

	NEW OIL BLOCKED OUT DURING YEAR				
Year	Through Revisions of Previous Estimates and Extensions to Known Fields	Through New Pools Discovered During Year	Total Through New Discoveries, Extensions and Revisions	Production During Year	Estimated Proved Reserves as of End of Year
1936	.....	.....	.....	.....	13,063,400,000
1937	2,792,790,000	928,742,000	3,721,532,000	1,277,664,000	15,607,268,000
1938	2,243,571,000	810,493,000	3,054,064,000	1,213,186,000	17,348,146,000
1939	2,058,455,000	340,667,000	2,399,122,000	1,264,256,000	18,483,012,000
1940	1,607,012,000	286,338,000	1,893,350,000	1,351,847,000	19,024,515,000
1941	1,538,989,000	429,974,000	1,968,963,000	1,404,182,000	19,589,296,000
1942	1,618,925,000	260,051,000	1,878,976,000	1,385,479,000	20,082,793,000
1943	1,202,368,000	282,418,000	1,484,786,000	1,503,427,000	20,064,152,000

in the committee's annual reports covering the period from 1937 to 1943. Figures for 1935 and 1936, which were the first developed by the committee, are not available separately.

As in the past, this committee wishes to emphasize the fact that every effort has again been made to secure a fair, unprejudiced, and representative opinion. Each member in his district appointed a number of subcommittees to gather and study the necessary data. All previously determined factors pertaining to the various pools were examined and adjusted in the light of new information. The total personnel of the subcommittees which were largely responsible for the analysis of the data included many experienced geologists and petroleum engineers. We wish to acknowledge the valuable assistance and information received from these men, and others, and to thank all for their cooperation.

THE COMMITTEE ON PETROLEUM RESERVES

Statement of J. Edgar Pew on the A.P.I. Reserves Committee report on Crude Oil Reserves in the United States as of December 31, 1943.

The report of the crude oil reserves of the committee of the American Petroleum Institute deals only with estimates of **known Proved Reserves** of crude oil in the United States. This committee has never attempted to evaluate unproved reserves, for such estimates would only be guesswork regardless of whom the author might be. The committee deals only with proved known data in making its estimates, and therefore its findings are not offered as an inclusive estimate of all

50,000 GUN PERFORATING JOBS!

SO WHAT?

What does the Lane-Wells record of 50,000 successful Gun Perforating jobs mean to you?—frankly, just this: It means that our experienced field crews have perforated, as a matter of course, deep wells, hot wells, straight wells, crooked wells, single and multiple strings of casing,—tubing, drill pipe, gas wells, water well, even sulphur wells—and they're all *your* wells.

The Gun Perforating jobs we have done for *you* and 3,600 other oil companies have helped us develop the "know how" to meet and solve your Gun Perforating problems. We've tried to learn something from each job so that we could do just a little better on the next one. And we think you will agree that we have made progress since we introduced the service eleven years ago.

Whatever your Gun Perforating problems may be, you can be sure that Lane-Wells will "do the job right."

Lane-Wells has the Experience!

FIGHTING *Tomorrow's Tools-Today!*

LANE WELLS COMPANY

Factory, General and Export Offices:
5610 South Soto Street, Los Angeles
Houston Oklahoma City
24-HOUR SERVICE • 30 BRANCHES

the potential crude oil resources in this country.

Although the committee refuses to indulge in speculation, there is no doubt of the existence of great reserves of crude oil not yet discovered or proved, in addition to the Estimated Proved Reserves reported above. Every year new and important discoveries have been made and there is no reason to believe this trend shall suddenly come to an end in the foreseeable future.

Estimated Proved Reserves, as used in this report, represent only the known amount of crude oil in this country which may be extracted from the earth by present known methods from fields completely developed or drilled, or sufficiently drilled and explored to permit reasonably accurate calculation.

The full amount of crude oil resulting from a new discovery is not known until the productive limits of such new discovery can be fully outlined and usually this is not possible for a period of years. Hence the committee goes about computing the annual additions to Estimated Proved Reserves of crude oil by the following method:

Initially the committee includes in its estimate of the reserves of a new discovery only that part which in the preceding year has been proved on the basis of a conservatively defined formula. For instance, a field tested only by a few wells is assigned relatively low reserves, even though there is evidence that this figure may be augmented by subsequent drilling. This is listed as oil blocked out "Through New Pools Discovered."

In each succeeding year the committee reviews its original estimate of reserves in that field, taking into consideration the progress of development, such as the drilling of additional wells, the installation of gas or water drive, improved extraction methods, and the knowledge that has become available regarding the field's productivity and well performance. As a result of this annual review the Estimated Proved Reserves credited to that field are increased, or decreased, as the facts require, under the heading "Through Revision of Previous Estimates and Extensions to Known Fields" and this revision is carried into the total figure for the field.

Identical reviews are made annually of all known oil fields in the country. So conservative is the initial estimate in connection with a new pool discovered that additional reserves are added in later years to practically every field and from this source comes the greater part, by far, of our estimated new oil supplies each year.

Proof that the total capacity of an oil field may not become available for as long as 25 years after its discovery is illustrated by the history of the Spindletop Field near Beaumont, Texas. This field in the 25 years after its discovery produced approximately 65,000,000 barrels. Then oil from a deeper sand immediately along side of the original field was found. This new oil, estimated at an additional 65,000,000 barrels, could not have been measured prior to its actual development. Again, production from the East Texas field could never have been honestly estimated during its first two years at as much as 25 per cent of the original total reserves of that field.

The committee has undertaken this explanation because persons not entirely familiar with these surveys have misinterpreted the figure for Estimated Proved Reserves as representing the entire oil resources of the United States, and because of a growing tendency to consider only the reserves found "Through New Pools Discovered" as new additional oil. The point that I wish to emphasize is the very close relationship of reserves found "Through New Pools Discovered" and oil found "Through Revisions of Previous Estimates and Extensions to Known Fields." The reserves under each heading are equally important and each is as much a part of the yearly additions to Estimated Proved Reserves as the other.

Although it is not the function of the committee to speculate regarding the amount of oil existing in fields not yet discovered, we know there are vast areas yet unexplored that can produce oil, some of which have known structural conditions and all of which have sedimentary conditions favorable for the production of oil.

The oil industry has been handicapped in the past three years in its search for oil through a scarcity of skilled field manpower and a scarcity of equipment. Particularly burdensome has been the scarcity of technical engineers who have become so important in carrying on the geophysical work so necessary for the discovery of oil from deeper formations. Nevertheless the industry has met the unprecedented requirements for its products and at the same time has been able to maintain a favorable reserves position with little or no dimunition.

The only way this situation can be continued is through the discovery of new pools, or increases in the amount of oil in pools already discovered resulting from deeper drilling, extension of the producing area, better technique in production, more extensive secondary recoveries and an opportunity for development of vast new areas so far untested and undeveloped. The history of the industry demonstrates that adequate oil supplies can be obtained in this manner with a fair price level.

But the industry cannot discharge its responsibility to the public of giving assurance of adequate supplies for the future if it is required to continue depletion of its known reserves at a price based on costs which are less than the cost of replacing such reserves. A fair price level would be not only an incentive to the replacement of existing reserves, but it also would act as a spur to the development of synthetic oils derived from a distillation of coal and shale which we have in abundance. Thus if our reserves at some future date should fail, we would have synthetic substitutes on their way to commercial production.

It is my opinion that the oil industry, with an adequate and fair price for its products, will be able to meet this nation's requirements for oil products from these sources of supply for many generations to come. In giving such an assurance and assuming such a responsibility the industry should have maximum freedom of opportunity to operate in the national interest.

BUY

WAR

BONDS

Why the C-1 cargo ship doesn't need a convoy

C-1 is a plain name for a beautiful cargo vessel. Displacing 12,900 tons, it is capable of 40% greater speed than the EC-2 (Liberty). Its service record includes many instances of sailing without convoy, of evading and outrunning enemy submarines.

Construction of the C-1 necessarily calls for workmanship of a high order, an example of which—fitting drive shaft to propeller—is shown here.

Upright is the stern section of the shaft. When coupled with additional sections and installed in the ship, it measures double the length of a regulation bowling alley, weighs 52 tons and is dimensionally accurate to within 2/1000 of an inch.

This tolerance, however, isn't allowable in the joining of shaft and propeller. Several hours of meticulous fitting, scraping and refitting are required before the result is achieved—a solid "no tolerance" juncture able to withstand the strain and speed of turbine power.

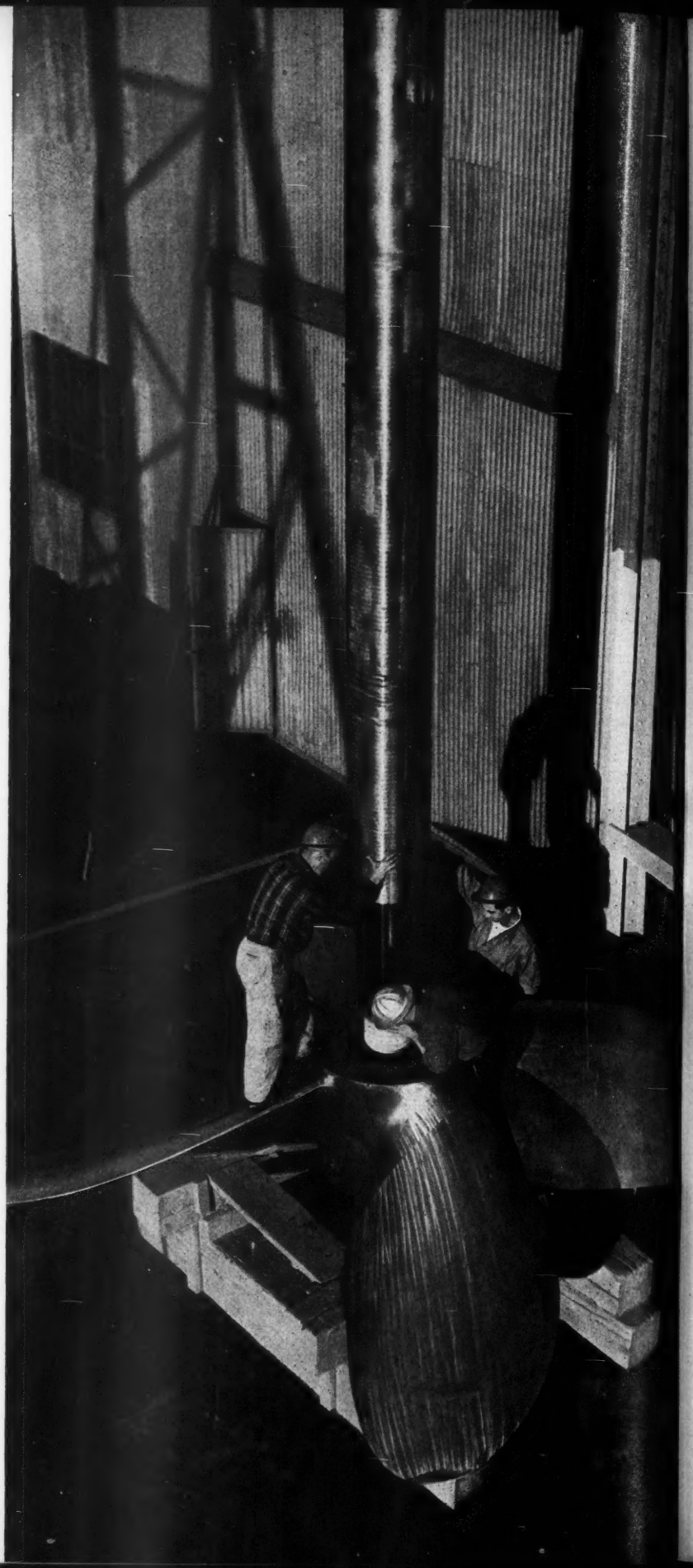
Efficiency in the production of the C-1, of naval craft and ordnance, of other war products has won for the men and women of Consolidated Steel Corporation every basic government industrial award. We intend to keep up the good work. And when victory is won, this organization of skills and crafts will again help to build in steel the great plans of a peacetime America.

Consolidated Steel

FABRICATORS
ENGINEERS
CRAFTSMEN

LARGEST INDEPENDENT IN THE WEST

CONSOLIDATED STEEL CORPORATION, LTD., LOS ANGELES, LONG BEACH, WILMINGTON, CALIFORNIA; ORANGE, TEXAS



Spring Meeting A.P.I. March 23, 1944

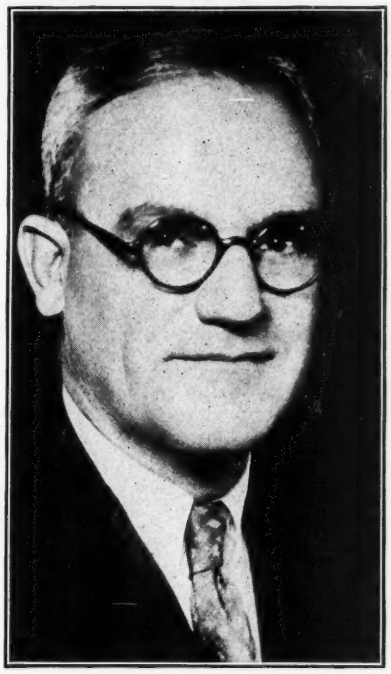
The annual Spring Meeting of the American Petroleum Institute, Division of Production, Pacific Coast District, will be held March 23 at the Los Angeles Biltmore, according to an announcement by Carlton Beal of Richfield Oil Corporation, district chairman.

Morning and afternoon technical sessions are scheduled, and the meeting will close with a dinner in the Biltmore Bowl. The dinner meeting will be addressed by J. R. Pemberton, well-known Los Angeles petroleum engineer and former state oil umpire. Mr. Pemberton will speak on "What Shall We Do About the Present Oil Situation in California."

An impressive program for the technical sessions has been announced by Program Chairman W. L. Jarvis of The Texas Company. A wide range of industry activities will be covered.

Secondary recovery, a subject on the minds of a great many operators at the present time, will have a prominent place on the program. R. C. Earlougher of Geologic Standards Company, Tulsa, Okla., will speak on "Controlled Water Flood Development and Operations in the Mid-Continent."

Robert E. Allen, former Californian and now director of public relations for the American Petroleum Institute, will come from New York City to address the meeting on "Public Relations in the Petroleum Industry." Mr. Allen, who was for many years identified with the oil conservation program in California and later served as assistant to the deputy petroleum administrator in the Petroleum Administration for War at Washington, will also show a sound motion picture, "Victory's Oil." The film has had wide favorable comment.



J. R. Pemberton
(Addresses Dinner Meeting)

Robert E. Allen
(Talks on Public Relations)

A paper scheduled for the morning technical session is entitled "Analysis and Use of P-V-T Data in Materials Balance Calculations," and is being prepared by Robert F. Loeck of Standard of California.

J. J. McCullough and P. H. Jones of the research department of Union Oil Co., will also present a paper at the morning session, "Determination of Interstitial Water Content of Oil and Gas Sands by Laboratory Tests of Core Samples."

Oil development on public lands, a subject of broad interest at the present time, will be discussed by R. M. Allan, Jr., of The Superior Oil Co., who has chosen as the title of his paper, to be read at the morning session, "Shall Oil Developments on the Public Domains be Encouraged?"

G. C. Pfeffer and Carl Tutshulte, of Tide Water Associated Oil Co., are preparing a paper on "Development and Production Performance of the Porter Reservoir in the Aliso Canyon Field." Of special interest to those engaged in the drilling end of the oil business will be a paper on "Drilling Fluid for the Completion of Shallow Wells," by W. H. Farrand and W. A. Clark of The Texas Company.

A feature of the afternoon session will be a paper on "Load Problems of a Natural Gas Utility," by H. P. George of the Southern California Gas Company. The addresses by R. E. Allen and R. C. Earlougher are also scheduled for the afternoon session.

Arrangements for the Spring Meeting are in charge of Jimmy Creed of Halliburton Oil Well Cementing Co. Tickets for the dinner in the Biltmore Bowl may be obtained from the American Petroleum Institute, 510 W. Sixth Street, Los Angeles 14, or from Ticket Chairman Jack Freeman of Republic Supply Company.

W. L. Jarvis
(Program Chairman)

Russell Elected V. P. Republic Supply Co.

In a recent announcement by the Republic Supply Co. of Calif., W. Dale Russell has been appointed to the position of Vice-President.

W. Dale Russell

Mr. Russell has been with Republic since the company was organized in 1917, having also served with its predecessor, The Tay-Pike Co. After considerable experience in the field, he came to Los Angeles in 1927, and has since specialized in the sale of oil country tubular goods and later in oil country wire rope. In his present capacity of Vice-President, his activities are concerned with the promotion of all lines handled by Republic.

Marsh Succeeds Swigart

T. E. Swigart, of Shell Pipe Line Corp., Houston, Texas, has resigned as national chairman of the API Committee on the Standardization of Pumping Equipment and Engines because his duties no longer are directly concerned with producing problems, it has been announced by J. Edgar Pew, general chairman of the standardization program of the Institute's Division of Production. Mr. Swigart is succeeded as chairman by H. N. Marsh, of General Petroleum Corp. of California, Los Angeles, now vice chairman.

BUY WAR BONDS

Cotrel Returns to Texas Co.

H. R. Gallagher announces the resignotion of W. H. Cotrel from P.A.W, where he has been acting as the P.A.W. representative on the Manpower Priority Committee and the Area Production Urgency Committee in Los Angeles. These Committees are responsible for handling the manpower and the urgent production problems for the West Coast Manpower program.

Mr. Cotrel returns to a new post at The Texas Company as Assistant District Manager of the Los Angeles District, which comprises California, Arizona and Nevada.

Mr. Cotrel has spent all of his active business career in the oil industry. He was with Standard Oil Co. of California for seven years, where he had charge of the Service Station Dept. in the San Francisco district. He left the Standard Oil Co. to go to work for the Richfield Oil Corp., where he spent eight years as Assistant Sales Manager. Prior to joining P.A.W., Mr. Cotrel was Superintendent of Sales for the Southern California Division.

He has been succeeded at P.A.W. by Raymond W. Varnum, who resigned his position as Chairman of the Marketing Committee under Clarence Beesemyer.

W. H. Cotrel

Geo. Murray Advanced by Tide Water Assoc. Oil

Tide Water Associated Oil Company announces the appointment of George J. Murray, Jr., as Public Relations Representative for the Company for Southern California.

Geo. J. Murray

No newcomer to the Company, Mr. Murray has a 22-year record of service in the Eastern Division. He has served in various executive and administrative capacities, including Assistant to the President, and for the past several years has been in charge of public relations activities of the Company's Eastern Division.

In his new assignment, Mr. Murray's responsibilities will include public relations and publicity for the entire Southern District.

Major Classen Joins Wilshire Oil Co.

Major Willard J. Classen, Army Air Corps, has been placed on an inactive status and has returned to the oil industry after twenty months service in the armed forces. He has taken over the duties of Chief Geologist for the Wilshire Oil Co. and affiliated companies. Major Classen at one time was connected with Tide Water Associated Oil Co. at San Francisco. Prior to his entry into the service he had maintained offices in the Mills Building in San Francisco as a Consulting Geologist and Petroleum Engineer since October, 1934. Major Classen plans to reside in Bakersfield, where he is opening offices for the company.

Frank P. Summers, Jr.

Has been appointed Pacific Coast Representative for W. C. Norris, Manufacturer, Inc., with offices with those of the Republic Supply Company. Mr. Summers comes to Norris with a wealth of experience in oil well pumping and production methods gained through some fourteen years of activity in California oil fields. His work will be devoted to the sale of Norris Sucker Rods and specialties for which The Republic Supply Company has recently been appointed exclusive distributor on the Pacific Coast

G. E. Man Goes to New Post

Paul C. Wilmore, General Electric Public Relations Manager for the West Coast, is being transferred to Cincinnati, Ohio, to head up the new G.E. household appliance distributing branch being established there, according to Mr. H. L. Andrews, vice-president in charge of the Appliance and Merchandise Department, Bridgeport, Connecticut.

Mr. Wilmore, well known in public relations and advertising circles, has spent the past five years on the West Coast, the first three of which he was manager of General Electric refrigerator sales in the Western Region, later becoming Public Relations Manager for the company, with headquarters in San Francisco.

Mr. F. Lowell Garrison, former sales manager, General Electric Supply Corporation, Butte, Montana, will take over Mr. Wilmore's former post, and continue General Electric contacts with newspaper and magazine media on the Pacific Coast. He will be located in the Russ Building, San Francisco.

C. E. Burt

C. E. Burt Now With Grant Oil Tool Co.

The merger of the Sorensen-Burt Manufacturing Company, a co-partnership consisting of A. W. Sorensen and C. E. Burt, with the Grant Oil Tool Company, has just been announced. C. E. Burt has been associated with the oil industry for the past 23 years, having been with General Petroleum Corporation, and for the past 20 years with Baker Oil Tools, Inc., as Vice President and Manager of Engineering and Production. Mr. Burt's duties with the Grant Oil Tool Company are in the capacity of Vice President and Assistant General Manager, a position which enables him to work closely with his many friends in the oil industry in developing new production and cementing tools and methods.

Now Sergeant Delaney

Louis Joseph Delaney, son of John J. Delaney, manager, Reliance Regulator Corp., Alhambra, Calif., has been given the rating of master sergeant in the Army Air Corps. Sergeant Delaney, an aerial engineer flight chief on active duty in the southwest Pacific area, has flown over 800 hours, including 25 combat missions.

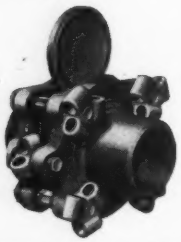
A.P.I. Report Petroleum Reserves

In the annual report of the A.P.I. committee on petroleum reserves headed by Mr. J. Edgar Pew, proved reserves of crude oil in the United States as of December 31, 1943, were given as 20,064,152,000 barrels. The report was issued on February 19.

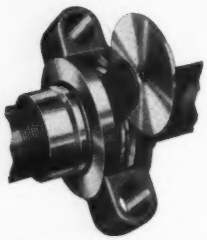
On the occasion of the 25th Anniversary of The McCarty Company, H. E. Cassidy, left, Vice President, and T. T. McCarty, President and Founder, look over some of the agency's first advertisements, placed in 1919.

New Hamer Line Blinds

A new bolted type line blind, especially designed for pipeline applications, and a new union type blind of very simple but rugged construction have been added to the already extensive selection of this class of equipment manufactured by the Hamer Oil Tool Company, of Long Beach, California.



MODEL BW30—All-Steel, Bolted Type Line Blind.



MODEL L150—All-Steel Union-Type Blind.

The bolted type blind, designated Model EW30, is available in sizes from 2½" to 12", of all-steel construction, and all flange nuts as well as the stud for spreading the flanges apart when changing the plate or spectacle are designed for turning with a straight bar. The plate or spectacle may be had with squeeze-type or pressure-seal packing retained in an annular groove in the plate, or it may be smooth for use with flat gaskets. Ends are threaded or beveled for welding, as preferred by the user. The simplified design makes it possible to offer this type blind at moderate cost.

The union type blind is also made of steel, and is available in sizes ¾" and larger. It consists of two subs, which may be screwed or welded in the line, and a bar operated nut slotted to receive the plate and flat gaskets. When the nut is turned to the left the faces of the subs are spread enough to release the plate. Turning the nut to the right draws the subs together so that the plate is tightly clamped between them and a positive seal is effected.

Both of these line blinds can be operated by one man to effect a positive and permanent shut-off, or to open the line, in about one minute. The body in each case is enclosed to prevent spilling of the line fluid while the plate is being reversed.

Twelfth and Thirteenth Production Awards Granted to Worthington Plants

Second and third star renewals of the Army-Navy "E" and Navy "E" production awards to two plants of Worthington Pump and Machinery Corporation have been announced by Admiral C. C. Bloch, U.S.N., Chairman of the Navy Board for Production Awards. The two "E" awards constitute the 12th and 13th honors accorded the men and women and management of Worthington.

Worthington's Harrison, New Jersey, works, producing a multitude of pumps of all types and main and auxiliary condensers and ejectors for Navy fighting ships, won its fifth citation for "production excellence." Besides four consecutive Navy "E" Pennants, the Harrison plant has been presented with the United States Maritime Commission's "M" Award Pennant and Victory Fleet Flag.

Producing steam turbines and turbo-generator units for the Navy's fighting ships, Worthington's Moore Steam Turbine Division at Wellsville, New York, has won a second renewal star, its third consecutive Army-Navy "E" Award.

Worthington turbo-generator units, without which modern Navy ships would be huge, helpless hulls of steel, are virtually the heart of the ship. From them pulsates the electrical energy which controls the ship, fires the guns, cooks the crew's food and makes possible operation of Radar and other detection devices.

To solve the shortage of cork, Brazil comes to the rescue. The Pao Santo tree has a bark which can be used as Erstaz cork. When ground into powder for caps, it is about 85 per cent as efficient as cork.

A.I.M.E. February Meeting

On February 10, the Junior Members of the Southern California Section of the A.I.M.E. met at Cole's Cafeteria in Huntington Park. Selection and application of data to establish maximum efficient production rates of oil reservoirs was the subject discussed by two most qualified men, Carlton Beal, Jr., of the Richfield Oil Corporation and Harold Clark. Mr. Beal is a member of the Engineering Subcommittee of the Production Committee of District 5. Mr. Clark is responsible for the work carried on under the direction of the Engineering Subcommittee.

The history of California curtailment of oil production prior to our entry into the war and the organization of the administrative agencies to cope with the changed picture since December 7, 1941, were briefly reviewed. Procedure of the Engineering Subcommittee and the nature of some of their perplexing problems were discussed.

The maximum efficient rate was defined as the highest daily rate of oil production that can be sustained by a field or pool for a period of six months with presently installed production equipment and without jeopardizing the maximum practicable ultimate recovery.

Some very interesting criteria of damage with respect to ultimate yield were presented. The interest in the subject was exemplified by the questions asked by the 30 men attending the meeting. Mr. Beal referred to a recently published article by Professor L. C. Uren which criticised the efforts of agencies charged with production control on the ground that their assumptions will generally not stand scientific scrutiny. Mr. Beal would welcome suggestions from Professor Uren which contribute to the solution of the problem.

Plans for a meeting of the members of the Junior Section and their ladies were announced. It is proposed to hold this meeting in May at Knott's Berry Place in Buena Park.

BUY WAR BONDS

THIS LAUGH OFF!!

The dumb rookie was up against the doctor who was asking questions.

Doctor: "How are your bowels?"

Rookie: "They didn't issue me none."

Doctor: "I mean are you constipated?"

Rookie: "Naw, I enlisted."

Doctor (exasperated): "What's the matter with you? Don't you know the King's English?"

Rookie: "Oh! Is he?"

Here lies the body of William Brace;
He sure was one fine fella,
He said in his sleep: "I love you, Grace,"
But his wifie's name was Stella.

A devoted son is one who permits his father to drive his own car once in a while.

Informed that he was the father of triplets, the excited man dashed at once to the hospital and into the room where his wife and newly arrived family were. The nurse, who had been out of the room, suddenly re-entered and remonstrated with him.

"Don't you know better than to come in here in germ-filled clothes?" she demanded. "Why, you're not sterile."

He looked at her for a moment and then said: "Lady, you're telling me."

According to an authority, the average woman commands a vocabulary of 800 words.

"The ones I meet," says Virgil F. Whiffletree, "use the other 799 trying to say 'No'."

"I want some grapes for my sick husband. Do you know if any poison has been sprayed on them?"

"No, ma'am. You'll have to get that at the druggist's."

The demure young bride, her face a mark of winsome innocence, slowly walked down the church aisle, clinging to the arm of her father. As she reached the platform before the altar, her dainty foot brushed a potted flower, upsetting it. She looked at the spilled dirt gravely, then raised her large childlike eyes to the sedate face of the old minister. "That's a hell of a place to put a lily."

A small storekeeper, much to the astonishment of his neighbors, suddenly decorated his shop window with a gorgeous new blind. It was the sensation of the day, and few of his brethren failed to make some remark to him about it.

"Nice blind you've got there, Isaac," said one.

"Yes, Aaron."

"How much did it cost you, Isaac?"

"It didn't cost me anything, Aaron. My customers paid for it."

"What! Your customers paid for it?"

"Yes, Aaron, I put a little box on my counter, 'For the blind,' and they paid for it."

She was married to a man whose devotion had never lagged, who never lost his self-control or grumbled whatever happened. Unfortunately, she was born with a temper like gunpowder.

"Tell me, dear," he said, after one of her outbursts, "how it was I never discovered this unhappy weakness of yours during our courtship days? How did you restrain yourself?"

The woman hesitated before answering such a straightforward question. Then, sobbing bitterly, she laid her head upon his shoulder.

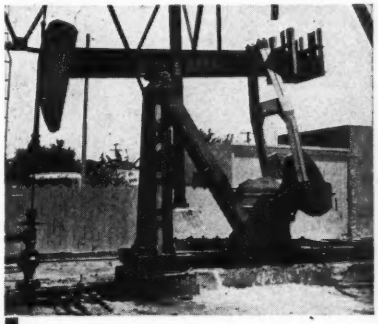
"I used to go upstairs," she gasped, "and b-b-bite p-p-pieces out of the top of the oak dressing table."

"I saw you the other day at the corner winking at the girls."

"I wasn't winking. That's a windy corner. Something got in my eye."

"She got into your car, too."

BUY WAR BONDS



Are you a good prospect?

Many producers who have standardized on JENSEN Units once used equipment they thought just as good as anything we could offer—or better. But they were willing to check up.

Our best prospects are men who want to be well informed on pumping equipment. Regardless of what they are using, they are willing to investigate, and a thorough investigation is likely to sell JENSEN Units.

So—we don't ask you to buy. But we do ask you to investigate. Please start by turning to our pages in your new Composite Catalog, or by writing for Bulletin No. 27.

California Representative
A. V. TURNER
445 W. 6th, Downey, California
Phone: Topaz 2-2410

Stocked By
THE OIL TOOL CORPORATION
3075 Cherry Ave., Long Beach, Calif.
Phone 281-81

JENSEN
BROTHERS MFG. CO.
Coffeyville, Kansas, U.S.A.

EXPORT OFFICE: 50 Church St., New York City

NO...IT'S REALLY pH THAT DOES THE CLEANING!

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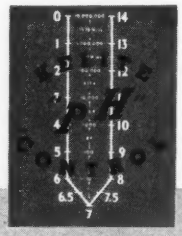

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Field Development

Los Angeles Basin

Aliso Canyon Development

Tide Water Associated Oil Co. Porter No. 46, outpost well on the southwesterly flank of the field, has been completed for an initial production of 2440 barrels per day of 24 gravity clean oil. The initial flow test was made through a 32/64 inch bean with 740 pounds tubing pressure and 550 pounds casing pressure. Gas production was gauged at 1,250,000 cubic feet per day. Located in section 28-3n-16w, the hole was drilled and cored to a total depth of 7963 ft. and plugged back to 7932 ft. A string of seven inch casing was cemented over the Sesnon zone at 7710 ft. and a five inch perforated liner landed at 7929 ft. Approximately 2000 ft. southwest of this well the company is drilling below 8350 ft. in Standard-Sesnon No. 1-3. While northwest of the field the Barnsdall-Bandini Pet Co. combine, Roosa No. 1, is swabbing and flowing by heads at an estimated rate of 100 barrels per day of 13 gravity oil. The hole was bottomed in Modelo brown shale at 6627 ft., plugged back to 5830 ft. and a string of 8⅝ inch casing cemented at 5511 ft. A 5¾ inch perforated liner was landed at 5830 ft. and 2½ inch tubing landed on a packer at 5450 ft. At this writing the well does not seem capable of making a commercial producer. Southeast of this well the Standard Oil Co. Frew No. 1-2, is drilling ahead in Eocene shale below 9260 ft. Located in section 29-3n-16w, the well found the Sesnon oil zone at 8300 ft. and is reported to have cored considerable Eocene oil sand below 9150 ft.

El Segundo "Cat" Testing

East of the sand dunes northwest of the town of El Segundo, the Pauley Brothers Loftus No. 1, is making a production test. Located 540 ft. south and 850 ft. east from the northwest corner of section 11-3s-15w, the hole was directionally drilled under the Los Angeles City sewer farm and although the well is located on city property the operator has refused to give out any information on the well. The hole was bottomed at approximately 7350 ft. after finding the top of the Nodular shale at about 7080 ft. and the top of the Schist conglomerate at about 7170 ft. The hole is now being swabbed with the fluid lowered to 6000 ft. To date the fluid recovered has consisted of water and mud with a little oil. The well is showing little life and apparently will not flow.

Inglewood Deep Test

Standard Oil Co. Baldwin Cienega No. 105, deep test well in the old Inglewood field is spot coring ahead in shale with streaks of volcanic material below 11,900 ft. The volcanic material has been found in streaks below 9600 ft. The company has released no information as to the type of volcanics being

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Athens	J. Paul Getty, Westmore	1	2, 3-14	1024	Drilling
Aliso Canyon	Barnsdall-Bandini Pet. Co. Roosa	1	29 3-16	6627	Swabbing
	Standard Oil Co., Frew	1-2	29, 3-16	9262	Coring
	Standard Oil Co., Del-Aliso	1	29, 3-16		Grade
Del Valle	Standard Oil Co., N. L. & F.	3-1	19, 4-17	7636	Redrilling
Dominguez	Cont. Expl. Co., Del-Amo	1	8, 4-13		Location
	Darling, O. F., Carson	1	35, 3-13	3347	Drilling
	Selbar Oil Co., Watson	1	17, 4-13		Rig
Downey	T.W.A.O. Co., Downey	10-1	4, 3-12	5959	Drilling
El Segundo	E. W. & H. R. Pauley, Loftus	1	11, 3-15	7256	Swabbing
Elysian	Seaboard Oil Corp., Park	1	9, 1-13		Grade
Loma Verde	Shell Oil Co., Shell-Cont.	86-20	20, 5-17		Grading
Newhall	Pet. Expl. Co., Kraft	1	31, 4-15		Grading
Norwalk	Gen. Pet. Corp., Comm.	14-1	7, 3-11		Rigging up
Puente	Alleghany Pet. Corp., Rowland	1	14, 2-10		Location
Seal Beach	Gilco, Inc., Well	1	10, 5-12		Rigging up
Sylmar	Richfield Oil Corp., T.I.T.	1	19, 3-15	8207	Standing cem.
Towsley Canyon	Haws & Ellsworth, H. E.	1	8, 3-16	100	Idle
Whittier	C.C.M.O. Co., E.Whittier Comm.	4-1	2, 3-11	6041	Drilling
	Union Oil Co., Sansinena	14	32, 2-10	3523	Drilling
	Orange County				
Buena Park	Gen. Pet. Corp., Heath	1	34, 3-11	7125	Drilling
Costa Mesa	Lovelady & Frambes, Destiny	1	9, 6-10	1550	Rigging up
East Coyote	Barnsdall O.Co., Sunny Hills Ranch	1	22, 3-10	6754	Stdg. cem.
	San Bernardino County				
Chino Hills	Chino Hills Oil Co., Kraemer	1	33, 2-8		Grade
	Wm. Y. Lee, Corehole	2	21, 2-8	3005	Waiting on csg.
Soquel Canyon	A. F. McCain, Soquel	1	6, 3-8		Rigging up
	Imperial County				
Salton Sea	Pure Oil Co., State	1	26, 10-9		Rigging up

found. The hole will be drilled into the basement rocks which are expected at any time. There have been no oil showings reported below the Sentous zone. This operator is also preparing to spud Vickers No. 1-37 and is rigging up on Cone No. 20, which will be drilled under the banner of the Standard Oil Co. of Texas.

Deep Test Completed

In the old Potrero field the Basin Oil Co. has completed Potrero No. 14, for an initial production of 200 barrels per day of 33 gravity clean oil. Located southwest of the Potrero Country club house, the hole was drilled and cored to a total depth of 9388 ft. at which depth the hole was junked with drill pipe. All attempts to recover the fish failed and the hole was redrilled from 6423 ft. to 9110 ft. A string of 4½ inch casing was cemented on bottom and gun perforated in stages between the depths of 8850 ft. and 8980 ft. The well is located in section 34-2s-14w, southeast from the intersection of Prairie and Manchester avenues.

Shasta Completes Torrance Well

Northwest of the intersection of Sepulveda Blvd. and Normandie St., the Shasta Pet. Co. has completed March No. 1. The well was completed on the pump for an initial production of 35 barrels per day of 15 gravity oil showing a gross cut of 30 per cent, located in section 24-4s-14w, the well was originally drilled by the Shell Oil Co. and completed from the Main zone at the total depth of 3852 ft. The present operator redrilled the hole from 3065 ft. to 3370 ft. and placed well on production from the Ranger zone which was topped at 3235 ft. This is the second well to produce from the Ranger zone in the Torrance field.

Barnsdall Tests Sunnyhills "Cat"

In section 22-3s-10w, midway between the East Coyote and the West Coyote fields, the Barnsdall Oil Co. S. H. R. No. 1, is testing 8⅝ inch casing which is cemented over the Stern zone at 6033 ft. The hole was bottomed in Miocene brown shale after finding the top of the Stern zone at 6060 ft. The operators present plans call for running a perforated liner to bottom and placing well on production.

Newhall Potrero Field Extended

Southeast of the known producing limits of the Newhall Potrero field the General Exploration Co. has completed Ferguson No. 2. Located in section 36-4n-17w, the hole was bottomed in oil sand at the total depth of 7114 ft. after finding the top of the second zone at 6854 ft. A string of seven inch casing was cemented at 6853 ft. and a 4¾ inch perforated liner landed at 7112 ft. The initial production was gauged at 475 barrels per day of 35 gravity clean oil. The completion of this well extends the producing limits of the field approximately 1000 ft. to the southeast.

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Coastal and Northern Districts

Richfield Stakes Casmalia Test

The Richfield Oil Corp. is surveying location for Escolle No. 1, in the northwest ¼ of section 20-9n-34w. Preliminary location is reported to be 660 ft. south and 330 ft. east from the northwest corner of the Escolle property. The well will be drilled to approximately 5000 ft. as a deep test of the old Casmalia field.

Activity At Rincon

During the past months this tideland field has seen a considerable increase in activity, with the C.C. M.O Co. carrying most of the load. This operator is currently preparing to redrill both Hobson B-23 and B-27 and also is preparing foundations for Hobson B-47 which will be an outpost well east of the present producing limits of the field. The General Pet. Corp. is preparing to drill another well on the Needham property after having just completed Ferguson No. 18. This well flowed initially at a 60 barrel per day rate of clean 31 gravity oil through a 12/64 inch bean with 75 pounds flow pressure. The production is coming from the upper Miley zone between the depths of 2326 ft. and 2368 ft. The Honolulu Oil Corp. State No. 56-7 is being placed on production from the upper Miley zone and the rig is being moved preparatory to spudding in State No. 56-8. The Richfield Oil Corp. Hobson State No. F-7, was completed from the intermediate zone for an initial production of 620 barrels per day rate of 28 gravity oil flowing through a 16/64 inch bean with 190 pounds tubing pressure and 440 pounds casing pressure.

Outpost Completed

West of the known producing limits of the Shiells Canyon field the Los Nietos Co. has completed Elkins No. 2-1. The well was drilled and cored to the total depth of 2989 ft. A string of seven inch casing was cemented at 2665 ft. and a five inch perforated liner landed on bottom at 2989 ft. On the pump the well produced at the initial rate of 115 barrels per day of 33 gravity clean oil. Both the El Rancho and the Elkins zones are open to production in the well. The completion of this well extends the producing limits of the field approximately one-half mile to the west and proves up the western portion of The Texas Co's. Shiells Canyon lease.

Deep Test Continues

Northwest of the town of Fillmore, the Standard Oil Co. continues to drill and spot core ahead in Fillmore No. 2-1. Located in section 24-4n-20w, the hole is now being drilled in gray sand and shale at 12,450 ft. The operator is releasing no information on the section being penetrated in the well. No showings have been reported at any depth.

Wilshire Stakes South Mt. "Cat"

The Wilshire Oil Co. is grading location for Petit No. 1. The location is reported to be 1650 ft. north and 1700 ft. west from the southeast corner of section 9-3n-20w. This location falls approximately two miles northeast of the easterly producing limits of the South Mt. field about 4 miles due east from the town of Santa Paula. The well is being drilled to test the Sespe formation.

Amerada Completes Thornton Gasser

In the Lodi-Thornton area of Sacramento county, the Amerada Pet. Corp. has completed McGillivray Comm. No. 1. Producing from the gun perforated interval of 3335 ft. to 3355 ft. the well gauged an initial production of 5666 MCF of dry gas per day flowing through a 32/64 inch bean with 990 pounds tubing pressure and 1300 pounds casing pressure. Located in the southeast ¼ of section 29-5n-5e, the well was drilled and cored to a total depth of 3500 ft., where the hole was bottomed in shale. A solid string of 5½ inch casing was cemented at 3385 ft. and gun perforated with 40, ½ inch shots. Approximately

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	Santa Barbara County				
E. Cat Canyon	Union Oil Co., McNee, C. H.	1	20, 9-32		Rigging up
Lompoc	S. R. Williams, Fickert	1	8, 7-33	2560	Idle
Los Alamos	J. I. Anderson & Co., So. Calif. Pet. Ol., Archambeault	1	3, 7-32		Bldg. rig
	Ventura County				
Camarillo	Camarillo Oil Co., Camarillo	2	32, 2-20	2647	Testing
	Jos. Schuck, Schuck	1	28, 2-20	952	Drilling
Fillmore	Standard O. Co., Fillmore Comm.	2-1	24, 4-20	12427	Drilling
Oxnard	Exeter Oil Co., Ltd., Lennox	2	6, 1-21	2812	Idle
	Hub City Pet. Co., Chase	1	6, 1-21	1955	Idle
Piru	Standard Oil Co., Bowman	2-1	14, 4-18		Rigging up
Santa Paula	J. J. Stevens, Corehole	1	31, 4-20	2969	Idle
Sespe	Volunteer Pet. Co., Tar Creek	3	28, 5-19	2044	Drilling
Shiells Canyon	Los Nietos Co., Elkins	2-1	5, 3-19	2989	Pumping
South Mt.	Cambria Oil Co., Well	1	13, 3-21		Location
	F. E. Fairfield, S. M.	1	19, 3-20	4991	Bailing
	Wilshire Oil Co., Petit	1	9, 3-20		Grading
Timber Canyon	Geo. H. Roberts, O'Leary	1	29, 4-20	380	Idle

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Butte	Richfield Oil Corp., Dayton	2-1	6, 21n-1e	850	Drilling
Glenn	Superior Oil Co., Capay Grant	2	13, 21n-2w	3740	Completed
Humboldt	Br.Am.O. Prod. Co., Mitchell-Dorr	1	10. 3n-1w		Rigging up
Sacramento	Amerada Pet. Corp., McGillivray	1	29, 5n-5e	3500	Completed
San Joaquin	Richfield Oil Corp., East Stockton	2	6, 1n-9e		Rigging up
San Luis Obispo	Los Nietos Co., Scott	2	5, 32s-13e	760	Drilling
	McDuffie, Wm. C., Dollie	2	31, 31s-12e	1315	Drilling
Solano	Honolulu-Barnsdall O. Co's., Liberty Farms	1	18, 5n-5e		Rigging up
	Standard Oil Co., Honker Comm.	1A	25, 3n-1w	8304	Redrilling
	Standard Oil Co., A. O. Stewart	1	25, 3n-1w	8728	Fishing D.P.
Tehama	Gen. Pet. & Union Oil Co., Dolan	1	33, 23n-3w	3589	Abandoned
	Richfield Oil Corp., Gallatin	1	26, 25n-3w	1265	Drilling
Yolo	Superior Oil Co., Oeste	1	10, 8n-1e		Grade

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two miles northwest of this well the Honolulu Oil Corp. and the Barnsdall Oil Co. are preparing to spud their joint test, Liberty Farms No. 1. The rig is located on section 18-5n-5e, in what is called the Liberty Island area of Solano county.

McDuffie Spuds Edna Test

On the easterly flank of the Edna field Wm. C. McDuffie has spudded in on Dollie No. 2. Located 950 ft. north and 1350 ft. west from the southeast corner of section 31-31s-13e, the well will be drilled to approximately 3500 ft. in search of production from the Pismo sand. Approximately 1½ miles southeast from this well, in section 5-32s-14e, the Los Nietos Co. Scott No. 2 is drilling ahead below 500 ft. The hole is located about 500 ft. east from the operator's recently completed Scott No. 1 which is currently producing 200 barrels per day of 20 gravity oil from the Pismo sand. Top of the producing zone was found at 3102 ft. in this well.

Richfield Active In Northern Counties

The Richfield Oil Corp is currently conducting a very active drilling campaign in the northern part of the state. The company is reported to have several thousand acres under lease north of Sacramento. In the Chico Creek area of Butte county, Dayton Comm. No. 2-1, is drilling in sand and shale below 1000 ft. While east of the city of Stockton, on section 6-1n-9e, East Stockton No. 2, is preparing to spud. In Tehama county, north of the town of Corning, Gallatin No. 1, is drilling ahead below 1300 ft. on section 26-25n-3w.

Whittier Test Running Low

The C. C. M. O. Co. East Whittier Comm. No. 4-1, is coring ahead in shale below 6000 ft. Well is reported to be running considerably lower structurally than the operator's previous test of the area Comm-No. 1-1. The try is located southeast of the town of Whittier in section 2-3s-11w, and will probably be abandoned in the very near future.

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San Joaquin Valley

Orland "Cat" Abandoned

North of the town of Orland, the joint venture of the General Pet. Corp. and the Union Oil Co. has been abandoned. Located in section 33-23n-3w, the hole was drilled and cored to a total depth of 3589 ft. Several unsuccessful attempts were made to test some fair gas showings which were found below 2500 ft. All tests failed due to the walls of the hole failing to stand up. The operator's future plans for the area are not known at this time.

Girard Abandons Fruitvale "Cat"

Approximately one mile northeast of the producing limits of the Fruitvale field, P. M. Girard has abandoned his Signal-Tieck No. 1. Located in section 13-29s-27e, the hole was bottomed in gray sand at the total depth of 3126 ft. A string of 6⅝ inch casing was cemented on bottom and gun perforated and tested in stages below 2365 ft. All tests recovered salt water with only minor showings of gas.

Richfield Spuds Corning Test

In Tehama county, north of the town of Corning the Richfield Oil Corp. has spudded in its Gallatin No. 1. Located in section 26-25n-3w, the hole is currently being drilled ahead below 1000 ft. The company is reported to have a huge block of acreage in this area. The hole will be drilled into the Cretaceous formations unless showings sufficient to make a well are found in the Eocene.

Richfield Stakes Rio Bravo "Cat"

Approximately three miles west of the town of Rio Bravo the Richfield Oil Corp. has staked location for a wildcat well which will be called KCL-Goose Slough No. 1. The location is reported as being 330 ft. south and 330 ft. east from the north ¼ corner of section 20-29s-25e. The well is being drilled to test the Stevens and the Vedder zones which at this location will probably not be found above 10,000 ft. This location falls about one mile south of Union Oil Co's. Kernco No. 88-8, which is currently drilling ahead below 4000 ft., near the southeast corner of section 8-29s-25e.

Amerada Testing Kingsburg Area

In the Kingsburg area of Tulare county the Amerada Pet. Corp, is drilling a series of core holes. The first test Dinuba Comm. No. 21-1, drilled near the center of section 21-16s-24e, has been abandoned in Granite at the depth of 518 ft. The next test, Dinuba Comm. No. 28-1, will be drilled 1673 ft. north and 1900 ft. east from the west ¼ corner of section 28-16s-24e, while location has been staked for Dinuba Comm. No. 22-1, near the center of section 22-16s-24e.

Buena Vista Well Shows Promise

On the southwest flank of the Buena Vista Hills field the Standard Oil Co. has apparently discovered a new producing zone in Well No. 54-27B. Located near the south ¼ corner of section 27-31s-23e, the well is currently drilling in sand and shale below 4500 ft. Two formation tests have been run to date on show-

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Cantua	Standard Oil Co., Well	88-3	3, 17-14	3365	Drilling
Coalinga	The Texas Co., S.P.	58-21	21, 19-16	9416	Fishing D.P.
Kerman	Seaboard Oil Corp., S.T.	1-28	28, 14-17	4296	Drilling
Polvadero	Standard Oil Co., Bourdieu	1A	1, 21-16	10868	Drilling
Raisin City	Herndon, Sam, Well	1	13, 15-18		Location
	The Texas Co., San Joaquin	1	11, 15-17		Grading
	Kern County				
Ant Hill	Shell Oil Co., Afana	1	18, 29-29	1143	Pumping
Bowerbank	The Texas Co., Bowerbank Unit II	8B	8, 29-24	4949	Fishing D.P.
Devils Den	Priest & DeKalb, Blake	1	25, 25-18	900	Drilling
Elk Hills	Capital Co., Tupman	1	24, 30-24		Location
Edison	Seaboard Oil Co., Garrison-Davis	2	30, 29-29	2156	Drilling
	Wilshire Oil Co., Cardoza	1	7, 30-29		Rig
Edison, SE	Judy K Oil Co., El Tejon	1	22, 30-30	2196	Drilling
Fruitvale	The Texas Co., KCL	1	26, 29-27		Rigging up
Grapevine	Kern Line Oil Co., Well	1	19. 11-19	9200	Redrilling
Jasmine	Western Gulf Oil Co., Quinn	1	8, 25-27	2691	Drilling
Kern Bluff	Standard Oil Co., Well	6-6	29, 29-29	1936	Stdg. plugged
Kern Front	Independent Expl. Co., Austin	1	28, 28-29	140	Drilling
Kern River	J. T. Wilcox, Zanetti	1	17, 28-28	3456	Cleaning out
McClung	Continental Oil Co., Easton	2	33, 29-26		Rigging up
McKittrick	Superior Oil Co., F. & W.	1	23, 29-21	1516	Drilling
Midway	Std. Oil Co., Ethel D.S.	1	36, 12-24	3000	Drilling
Mt. View	DiGiorgio Fruit Corp., Well	35-10	10, 31-29		Location
	T.W.A.O. Co., Porter	24-18	18, 30-29		Rigging up
Poso Creek	Butler Bros. Oil Co., Butler	2	14, 27-27		Location
	Grandell Oil Co., Newhope	3	11, 27-27		Rig
Pyramid Hills	Pac. O. & G. Dev. Corp., C.C.M.O.	3	17, 24-18		Prep. to spud
Rio Bravo	Richfield Oil Corp., KCL-Goose Slough	1	20, 29-25		Foundation
	Union Oil Co., Kernco	88-8	8, 29-25	6855	Drilling
Rosedale	Western Gulf Oil Co., KCL-A	37-14	14, 29-26	3546	Drilling
Round Mt.	Bandini Pet. Corp., Signal Mills	5A	24, 28-28	1766	Drilling
	Gen. Pet. Corp., Railroad	4	23, 28-28	2613	Rng. liner
	Hall, E. B. & Co. Russell	1	6, 28-29	1171	Abandoned
	Signal Pet. of Calif., S. P.	1	25, 28-28	2813	Drilling
	The Texas Co., KCL	1-13	13, 28-28		Location
	Wilshire Oil Co., Hartfield	1	32, 28-29		Rigging up
Shafter	T.W.A. Oil Co., Shafter Comm.	86-7	7, 28-25	11680	Drilling
So. Belridge	Bandini Pet. Co., Bacon	1	27, 28-20		Location
Strand	Superior Oil Co., Houghton	36-35	35, 29-26	358	Drilling
Stockdale	W.G.O. Co., KCL	77-5	5, 30-27		Rig
Tejon	Richfield Oil Corp., Tejon	B-23-6	6, 11-18		Rigging up
	Richfield Oil Corp., Tejon	B-14-36	36, 11-19		Rigging up
Temblor	B. F. Delanty, Well	69-A-1A	36, 29-20	292	Drilling
10 Section	Ohio Oil Co., KCL	J-1	6, 31-26	8141	Drilling
	Madera County				
Herminghaus	The Texas Co., Gill	41-17	17, 13-16		Location
Firebaugh	The Texas Co., Moffat	55-7	7, 12-15		Rig
	Tulare County				
Kingsburg	Amerada Pet. Corp., Dinuba	20-1	20, 16-24		Rigging up

ings found in the upper Miocene. The first was made of the interval 4273 ft. to 4305 ft. With the tester valve open for 12 minutes, well showed a strong blow of gas in three minutes and although most of the fluid was blown from the drill pipe, a considerable quantity of 31 gravity clean oil was recovered. The second test was made of 100 ft. of zone below 4350 ft. The tester was open for eight minutes with a strong blow of gas reaching the surface in three minutes. Clean oil was blown from the drill pipe while the tester was being pulled. Fluid recovered consisted of 460 ft. of live gassy 31 gravity oil. Hole is now being deepened in search of a third zone. At this writing, the well appears to have made a major Upper Miocene discovery.

Shell Discovers Shallow Field

Approximately two miles southeast of the Kern River field the Shell Oil Co. has discovered a new shallow field. Afana No. 1 was completed on the pump for an initial production of 14 barrels per day of 15 gravity oil showing a cut of 70%. Located near the northwest corner of section 18-29s-29e, the hole was bottomed in gray sand and shale at the total depth of 1143 ft. and plugged back to 1035 ft. A string of 6⅝ inch casing was cemented at 1001 ft. and a 5 inch perforated liner landed at 1035 ft. As yet the operator has released no information on the age of the sand being produced. The well has partially cleaned up and is currently producing 15 barrels per day of 15.4 gravity oil showing a cut of 25%.

Deep Test Stopped

The Standard Oil Co. Bourdieu No. 1, deep test well of the Polvadero area has been bottomed in middle Eocene, Hondo Siltstone. Located in section 1-21s-16e, northwest of the Kettleman Hills North Dome field, the well was drilled and cored to a total depth of 10,868 ft. A 4¾ inch liner is now standing cemented on bottom preparatory to testing showings found in the Eocene sand between the depths of 10,720 ft. and 10,820 ft.

Coles Levee Test Getting Deep

The Standard Oil Co. KCL No. 20-13, is assuming all the aspects of a deep test. Located on the northwest flank of the field, near the east ¼ corner of section 5-31s-25e, the hole is currently being drilled in shale below 12,000 ft. The operator is withholding all information on the section being penetrated.

Murvale Completes Taft Producer

Southeast of the town of Taft the Murvale Oil Co. has completed well No. 58-20. Located in section 20-32s-24e, the hole was bottomed in Claystone at the total depth of 3413 ft. A string of 6⅝ inch casing was cemented at 3315 ft. and a 4¾ inch liner including 96 ft. perforated landed at 3411 ft. The well was completed flowing, for an initial production of 285 barrels per day of 25 gravity clean oil, through an 18/64 inch bean with 220 pounds flow pressure. Gas production was gauged at 59,000 cubic feet per day. The company is currently drilling Well No. 76-20, below 2500 ft.

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